



**NetMark
Baseline Survey on
Insecticide Treated
Materials (ITMs)
in Nigeria**

May 2001



NetMark Formative Qualitative Research on Insecticide Treated Materials (ITMs) in Zambia is a publication of the NetMark Project. NetMark is supported by the U.S. Agency for International Development under Cooperative Agreement No.HRN-A-00-99-00016-00 and managed by the Academy for Educational Development. The opinions expressed here are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the Academy for Educational Development.



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ACKNOWLEDGEMENTS

This study was conducted by the NetMark Project of the Academy for Educational Development (AED). The United States Agency for International Development (USAID) provided funding for this research. Research International (RI) was contracted to implement the research and manage the data.

A number of individuals participated in the development, conduct, and/or analysis and report writing of this research. Dr. Carol Baume provided overall technical direction for the study and the report. Dr. Silvia Holschneider and Dr. Nancy Nachbar led the pilot fieldwork. Dr. Silvia Holschneider took the lead role in coordinating the data analysis and writing the report. Mr. Joe Boniaszczuk was in charge of interviewer training, organization of the fieldwork, and data entry and management.

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LIST OF ACRONYMS

AED	Academy for Educational Development
ITMs	Insecticide treated materials
ITNs	Insecticide treated nets
RI	Research International
SES	Socio-economic status
UNICEF	United Nations' Children's Fund
USAID	United States Agency for International Development
USD	U.S. Dollars
WHO	World Health Organization
WRA	Women of reproductive age

MAP OF NIGERIA



EXECUTIVE SUMMARY

- PURPOSE:** Provide baseline measures of
- Knowledge and beliefs about mosquitoes and malaria
 - Beliefs and attitudes about use of treated and untreated mosquito nets
 - Access, affordability, and ownership of mosquito nets
 - Net treatment practices
 - Use of nets and treated nets by vulnerable groups: children under five, pregnant women, and women of reproductive age
 - Consumer preferences regarding mosquito nets
 - Usage and attitudes regarding mosquito control products

METHODOLOGY: Survey

SAMPLE: 1000 Nigerian households from 5 sites: Lagos, Ibadan, Nsukka, Maiduguri, and Kano. Target sample in each site was 200: 80 respondents from urban households, 60 from households within 100km, and 60 from households 100-200 km from the urban center. Respondents were women aged 15-49 who were mothers/guardians of children under five years of age.

DATA COLLECTION: October 2000

STUDY FINDINGS:

Knowledge and beliefs about malaria and mosquitoes

Recognition of the English term “malaria” was very high and knowledge of symptoms good; however knowledge about causes and vulnerable groups was somewhat low. Exposure to information about malaria prevention appears low and came mainly from health personnel, friends, or relatives.

- Almost all respondents (94%) reported having heard of the English term “malaria.” Sixty-two percent (62%) mentioned fever as a symptom; most named other symptoms that are also manifestations of malaria. Hardly any (1%), however, mentioned convulsions, a symptom of severe malaria. Only 55% knew that children under five and pregnant women are the groups most susceptible to severe malaria. Although the vast majority knew that mosquitoes cause malaria (81%), only 29% knew that mosquitoes are the *only* cause of malaria.
- Over half (60%) of the respondents had not received any information about avoiding malaria in the past 12 months. Among the 40% who had received information about malaria prevention, the main sources of information were health personnel (37%) and friends or relatives (33%). Eighteen percent (18%) of respondents had heard information *only* from non-professional sources (friends, neighbors, or relatives), rather than from more professional and presumably more reliable sources.

Perceived advantages and disadvantages of net use

Levels of perceived advantages of net use by vulnerable groups—children under five and pregnant women—were high, while levels of perceived disadvantages were relatively low. Nets were seen as providing good protection against mosquitoes and malaria. *Treated* nets were seen as especially effective, with the added advantage of killing and repelling mosquitoes. The main disadvantages of nets were discomfort from heat and inconvenience. Respondents cited stronger disadvantages of *treated* nets, voicing concern about the safety of the chemical and its smell.

- Almost all respondents (98%) perceived advantages for a child under five sleeping under a mosquito net. Most commonly mentioned advantages were “avoid getting bitten by mosquitoes”(79%); “avoid getting malaria” (31%); and to “sleep better” (19%).
- Sixty eight percent (68%) cited disadvantages for a child under five sleeping under a mosquito net. The most commonly mentioned disadvantages were “it is hot sleeping under a net” (27%); “it is difficult/inconvenient if the child has to get up in the night” (11%); “there is not enough air under the net” (10%); “child may suffocate” (8%); and “child may tear the net” (8%).
- Almost all respondents (95%) perceived advantages for a child under five sleeping under a *treated* net. The most commonly mentioned were “kills mosquitoes” (48%) and “works better against mosquitoes than an untreated net” (39%).
- Sixty one percent (61%) cited disadvantages for a child under five sleeping under a *treated* net. The most commonly mentioned disadvantages had to do with concerns about the safety of the chemical: the “chemical is dangerous” (18%), “causes cough/irritation” (13%), “causes illness” (11%), or even that it “can kill child” (9%).
- Almost all respondents (94%) perceived advantages for a pregnant woman sleeping under a *treated* net. The most commonly mentioned were “kills mosquitoes” (44%) and “works better against mosquitoes than net that has not been treated” (38%).
- Sixty five percent (65%) cited disadvantages for a pregnant woman to sleep under a *treated* net. The most commonly mentioned disadvantages had to do with smell and safety issues: “smell is bad” (20%); “chemical is dangerous” (17%); “might make the pregnant woman nauseated/vomit” (16%); “causes irritation/cough” (11%); and “chemical can kill fetus/cause miscarriage” (10%).

Access to mosquito nets

Access to nets was limited; it appears that few outlets carry them and consumers would have to travel fairly far to find them.

- The great majority (92%) of respondents said that the closest place they could purchase a net was an outdoor market, and that the average time to get to there would be approximately one hour by bus.
- Four percent (4%) said they did not know where to purchase a net, or that nets were unavailable.

Mosquito net ownership, treatment, and use

Net ownership in the study sites was somewhat low. Almost all nets had been obtained from informal commercial sources. Non-owners said that the main reason they did not own a net was cost. Although children under five and pregnant women are more likely than other family members to use nets, overall use of nets by vulnerable groups was low and nets were not used year-round. Awareness of *treated* nets was very low, and treatment of nets was virtually nonexistent.

- Twelve percent (12%) of households reported owning a mosquito net, although 25% of net-owning households owned more than one mosquito net. Households in the highest socio-economic status (SES) segment were more likely than other households to own a net.
- Few (7%) households had heard of treating mosquito nets with insecticide solution. Those from higher SES households were more likely to be aware of net treatments. Only one household reported owning a net that had been pretreated with insecticide before purchase, and no household had treated a net since purchase.
- About three-fourths (73%) of children under five in net-owning households slept under a net the prior night, representing 9% of all children under five in the households in the sample. Only one household reported owning a *treated* net, and one child under five in that household did sleep under the *treated* net the night prior to the interview. The proportion of net-owning households where all children under five slept under a net the prior night decreased the more children the household had.
- About half (47%) of women of reproductive age in net-owning households slept under a net the prior night, representing 6% of the total number of women of reproductive age in the households in the sample. Only one household reported owning a *treated* net. No woman of reproductive age slept under a *treated* net the night prior to the interview. Fifty-eight percent (58%) of pregnant women in net-owning households slept under a net the prior night, representing 7% of pregnant women in the households in the total sample. (The denominators for pregnant women, however, were very small.) None slept under a *treated* net.
- For those household members who did sleep under mosquito nets, the average number of months per year they slept under nets was 7.6.
- Two or three people usually slept under a large net.
- Over half (60%) of non-owners said they didn't own a net because they don't have enough money; another 22% said they did not like or need nets.

Characteristics of nets owned

Almost all nets were purchased in an open-air market. Most had been purchased within the past four years. Almost all were rectangular, and most were either single or double size; average price among all nets was 4.92 USD. Tailor-made (non-manufactured) nets were common. Nets are currently unbranded products; consumers were unaware of the brand. The vast majority of nets were reportedly washed at least every month.

- The vast majority of nets owned were purchased in the market (90%). Only those households in the highest SES segments purchased their nets from a formal commercial source (fixed store). Over one-fourth (28%) of household nets had been acquired within the past 2 years; 21% had been acquired five or more years ago.
- Households reported paying an average of \$4.92 USD per net (conversion based on the exchange rate for the dollar on the date of the data collection).
- A high proportion (38%) of nets owned were tailor-made, especially in Lagos, Ibadan, and Kano sites.
- Only 3% of nets were identified as being of an existing brand.
- The most common net sizes owned were single (35%) and double (31%). The most common shape was rectangular (93%).
- The vast majority of nets (91%) had been washed. Over three-fourths (77%) of nets that had been washed were reportedly washed at least once a month, with about one-third (32%) being washed weekly.

Consumer mosquito net preferences

Consumers, whether net-owning or not, generally preferred rectangular, king size, light-colored nets.

- Over half (59%) of all respondents preferred rectangular shaped nets; one-fourth (24%) preferred round/conical nets. Preferred net sizes were king (56%) and double (35%).
- Thirty-four percent (34%) preferred white mosquito nets; 22% pink; 15% light blue; and 12% light green. Over half (52%) disliked black nets; 14% disliked dark green; 10% disliked dark blue; and 9% disliked white nets.

Awareness, use, and price of mosquito control products

Aerosol insecticides and mosquito coils were the mosquito control products that consumers were most aware of and used. Consumers tended to purchase these products frequently, from different types of outlets.

- Awareness (unprompted) of mosquito control products was highest for aerosol insecticides (80%) and mosquito coils (78%); few respondents (8%) were aware of repellants. The most frequently used products were coils (62%) and aerosol insecticides (54%). (These use figures may be low, given that “use” was asked only of those who indicated unprompted that they were aware of a given product.) Use of aerosols was higher in urban areas whereas use of coils was higher in rural areas.
- The average reported price for 300-350 ml can of aerosol insecticide (the size the majority of respondents bought) was \$1.35. Single mosquito coils averaged \$0.06. Nearly three-fourths (73%) of households that had purchased mosquito coils in the 12 months prior to the interview did so within the last 7 days; 62% of households purchased aerosols within the last month or less. Aerosols were generally purchased in markets (50%), kiosks (15%), and supermarkets (10%). Coils were most frequently purchased in kiosks (49%) and markets (25%).

Perceptions of mosquito control attributes, products, and brands

The most highly valued attribute that consumers wanted in an insect control product was that it kills mosquitoes. Consumers rate sprays/aerosols most highly on this and other desired attributes. Mosquito nets and window screens were considered to be most safe around children. Consumers were most aware of the Mobil, Shelltox, and Raid brands. Mobil and Raid were associated with the insect control attributes they most value.

- On a scale of 1-7, respondents said that the most important attributes of mosquito control products were “kills mosquitoes” (6.08), “high quality and effective brand” (5.75), and “reduces malaria” (5.71).
- Respondents rated sprays/aerosols more highly than all other insect control products on “kills mosquitoes” (82%); “keeps mosquitoes away for a long time” (64%); “keeps mosquitoes away while sleeping” (63%); “is a good value for the money” (64%); “is a long-term solution to mosquito problems” (63%); “is a high quality/effective brand” (76%); and “reduces malaria” (51%). Mosquito nets were considered to be the safest product to use around children, and were also associated with “keeps mosquitoes away while sleeping” (62%) and “is a long-term solution to mosquito problems” (63%).
- Brand awareness was highest for Mobil (85%), Shelltox (70%), and Raid (65%). Awareness of any brands was lower in rural than in urban areas. Mobil and Raid were most associated with the insect control attributes consumers value.

PROGRAM/PRODUCT IMPLICATIONS:

There are a number of favorable factors for ITM promotion and sales, but efforts are needed to increase availability and access to ITMs, to overcome some negative perceptions of nets and net treatments, and to stimulate product demand.

Favorable factors include:

- high awareness of malaria and general understanding of how it is transmitted;
- fairly common use and frequent purchase of commercial insect control products;
- favorable attitudes toward safety of mosquito nets compared to other insect control products;
- evidence of higher net coverage where nets have been promoted;
- strong valuing of the product attributes that ITMs deliver;
- high level of perceived advantages of net use by vulnerable groups.

Main barriers to overcome for ITM promotion are:

- perceived high cost of nets and limited access to nets;
- lack of variety in net size, shape and color; lack of strong net branding;
- some negative perceptions of nets;
- concerns regarding the safety and potential adverse health effects of treated nets, particularly with regard to young children and pregnant women;
- novelty of net treatment/re-treatment; virtually non-existent treatment practices;
- inadequate use of ITMs by young children and pregnant women;
- low exposure to malaria prevention messages;
- misperceptions about the causes of malaria and groups most vulnerable to severe malaria.

SECTION 1

INTRODUCTION

1.1 BACKGROUND

The Problem of Malaria

Malaria is a growing health problem in Africa. Each year, 300-500 million people worldwide suffer from the disease, with 9 out of 10 cases occurring in sub-Saharan Africa (WHO, 1998). Malaria kills at least 1 million people each year and the vast majority of deaths occur among children less than five years of age. In Africa, one out of twenty children is likely to die of a malaria-related illness before his fifth birthday (WHO, 1999). Pregnant women are also particularly susceptible to the disease. Malaria during pregnancy causes severe anemia, miscarriages, stillbirths, and maternal deaths, and may account for up to 40% of preventable low birth weight among newborns in endemic areas (Brabin, 1991; UNICEF, 1999). Malaria places a staggering economic burden on already strained national economies and on struggling families. The disease cost sub-Saharan African nations more than 2 billion USD in 1997 (WHO, 1998) and has slowed economic growth in Africa by up to 1.3% each year (Gallup & Sachs, 2000). In addition, malaria reduces human work capacity and productivity, and affects social development indicators such as child health and school attendance (Global Forum for Health Research, 2000).

Consistent use of mosquito nets and curtains that have been treated with insecticide—insecticide treated materials, or ITMs—has been proven effective in reducing malaria. Current data indicate that ITM use can prevent 19% of child deaths from all causes, with some country-specific studies in Africa suggesting that as much as 42% of all-cause mortality among children under-five can be averted. Additionally, malaria morbidity in children under five has been shown to decrease by as much as 21-72% when ITMs are used (Lengeler, 1998).

To date, however, few families in Africa have mosquito nets and there has been little consumer marketing and distribution of ITMs in most African countries. Where they have been marketed (e.g., Tanzania and The Gambia), their supply has been limited and often donor-organized and subsidized. Currently, many households use other anti-mosquito measures such as coils and aerosol sprays to prevent nuisance biting, but the efficacy of these products in preventing malaria remains unknown.

NetMark

NetMark is a United States Agency for International Development (USAID)-funded effort to promote the use of ITMs to prevent malaria in sub-Saharan Africa through the formation of public-private partnerships. Managed and carried out by the Academy for Educational Development (AED), the NetMark partnership includes, in addition to AED, the U.S. government, The Malaria Consortium of the London School of Hygiene and Tropical Medicine & the Liverpool School of Tropical Medicine, The Johns Hopkins School of Hygiene and Public Health, and Group Africa. The primary goal of NetMark is to develop a sustainable market for ITMs, especially mosquito nets (bednets), in target countries in Africa. The main objectives of the project are to increase the proportion of households that own ITMs, increase nightly use of treated nets, especially by those most vulnerable to malaria (pregnant women and children under five years of age); and increase the proportion of net owners who regularly retreat their nets with insecticide.

1.2 SURVEY OBJECTIVES, SAMPLE, AND IMPLEMENTATION

Objectives

As part of a comprehensive research agenda that includes both market and behavioral research, NetMark conducted a household survey in Nigeria, Zambia, Uganda, Senegal, and Mozambique to serve as an evaluation baseline. The baseline survey was to provide quantitative information useful to the public health community as well as to the private sector. Specifically, the objectives of the survey were to provide data on:

- Knowledge and beliefs about mosquitoes and malaria
- Beliefs and attitudes about use of treated and untreated mosquito nets
- Access, affordability, and ownership of mosquito nets
- Net treatment practices
- Use of nets and treated nets by vulnerable groups: children under five, pregnant women, and women of reproductive age
- Consumer preferences regarding mosquito nets
- Usage and attitudes regarding other mosquito control products

In addition, the baseline survey information will supplement the NetMark qualitative research findings to inform the development of insecticide and net products and to design regional promotional campaigns encouraging the purchase and correct use of these products.

The same instrument was used in each of the five countries in order to ensure comparability of data. This document reports on findings from Nigeria. Reports on the other four countries are also available from NetMark.

Sample

This survey was conducted among 999 Nigerian households with women aged 15-49 who were mothers or guardians of children under five years of age. The sample was drawn from five sites: Lagos, Ibadan, Nsukka, Maiduguri, and Kano. In each site, the target sample was 200: 80 respondents from the urban center, 60 from households within 100 kilometers from the urban center, and 60 from households located 100-200 kilometers from the urban center. Table 1 shows the actual distribution of the sample across sites.

Table 1: Distribution of sample among sites

Site	Total	Urban	Near Rural 100 km from Urban	Rural 200 km from Urban
Lagos	200	80	60	60
Ibadan	200	80	60	60
Nsukka	200	80	60	60
Maiduguri	200	80	60	60
Kano	199	79	60	60
TOTAL	999	399	300	300

A multistage sampling procedure was used to select the respondents participating in the survey, as follows:

1- Selection of primary sampling units: Purposive sampling was used to select five sites across the country that reflected the geo-ethnic diversity of the population. (See Table 2.)

2- Selection of sampling points: Within each of the five sites, 20 sampling points (villages or urban neighborhoods) were randomly selected from electoral lists using quota sampling: 8 from within the city (“urban”); 6 from within 100 kilometer radius from the city (“near rural”); and 6 from within a 100-200 kilometer radius from the city (“far

rural”). This stratification scheme was designed to meet the purposes of the evaluation. Since a key objective of NetMark is to increase access to ITMs across the socio-economic spectrum, it was essential to include urban centers with the potential to be reached by product distribution systems, as well as include households located at varying distances from the urban center.

3- Selection of households: Ten interviews were conducted per sampling point, each in a different household. For each sampling point, a starting point (a fixed landmark or address) and the direction from which to start the data collection were chosen. Interviewers were instructed to go to the starting point and walk in the chosen direction until they located a residence with a qualified respondent. After a successful interview, interviewers were instructed to skip five residences (or less if residences were far apart) and seek another qualified respondent.

4- Selection of eligible respondents: An eligible respondent for the evaluation was a female 15-49 years old who was the parent or guardian of a child under five years old, i.e., aged 0-4. Females aged 15-49 were selected to maximize the sample size for calculating the proportion of females of reproductive age sleeping under a net. Similarly, only those women who had a child under five were included, to maximize the sample size for calculating the proportion of children under five sleeping under a net.

This sampling procedure was designed to meet the purposes of this study. In the interest of cross-national comparability, the procedure was standardized across all five countries surveyed. The sampling strategy resulted in an urban-rural breakdown that approximates the national proportions: this sample is 40% urban and 60% rural, and data from World Urbanization Prospects (United Nations, 1994) found that Nigeria was 39% urban and 61% rural.

In other ways, however, the sampling procedure devised for this study may have resulted in a sample that differs from a true national random sample (which was neither desirable nor feasible in this case):

- a) Net promotion activities in or near the study sites may have resulted in net ownership rates that are higher than those that would have been obtained by a true national random sample. For example, there have been mosquito net projects in several communities toward the northwest of Nsukka town, and rates of ownership are higher in Nsukka than in other areas.
- b) Only households with children under five were included in the sample, and the extent to which these households differ from other households with respect to the variables measured is not known.
- c) Only women of reproductive age were selected as respondents. Responses from men or from older women may differ from those of the women in the sample.

Table 2: Study sites, location and main ethnic/language groups

Site	State	Ethnic Group/Language
Lagos	Lagos	Multi-ethnic
Ibadan	Osun	Yoruba
Kano	Kano	Hausa
Maiduguri	Borno	Hausa
Nsukka	Enugu	Ibo, Pidgin English

Implementation

The research was carried out by NetMark and the Africa offices of Research International (RI). NetMark staff developed the survey instrument based on NetMark qualitative research and a review of existing instruments on ITMs; subsequently, the draft was reviewed by colleagues from RI as well as from collaborating institutions and countries. NetMark and RI jointly conducted nearly a week of instrument pre-testing in Zambia in September 2000. In October, NetMark and RI jointly conducted the training of local Nigerian data collectors, and thereafter RI managed the implementation of the survey. The data were collected during October 2000.

To maximize comparability of data, the surveys were administered in all five countries (Nigeria, Senegal, Zambia, Uganda, and Mozambique) more or less simultaneously, during October and November of the year 2000. It should be noted, however, that the timing of the rainy season differs by country, and is likely to affect net use patterns. In Nigeria, the timing of the study meant that the data were collected near the end of the rainy season in the Southern sites (Lagos, Ibadan, Nsukka) and just after the rains in the North (Kano and Maiduguri).

1.3 ORGANIZATION OF THE REPORT AND TABLES

After describing the sample, this report presents findings grouped into three main areas: (1) knowledge and beliefs about mosquitoes and malaria; (2) mosquito nets; and (3) other mosquito control products. Implications of the findings are discussed in the final section.

This report attempts to present a large amount of data in a standard and accessible way. It includes a complete set of tables to serve as a data resource, and each table is accompanied by statements summarizing the main results. Each of the five country reports contains the same set of tables, for purposes of comparability.

In most of the tables in this report, data are broken down in several ways:

- By **site**: the five primary sampling areas (i.e. Lagos, Ibadan, Nsukka, Maiduguri, and Kano), each of which includes both urban and rural areas
- By **location**: a refined urban-rural breakdown, which distinguishes between respondents in Lagos proper, those in the four other urban centers, those living in “near rural” areas (within 100 km from the urban center) and those living in “far rural” areas (100-200 km from the urban center).
- By **urban-rural**: all urban respondents across sites compared with all rural (both “near rural” and “far rural”) respondents across sites.

Some variables are also broken down by socio-economic status (SES). A description of the variables in the SES scale and of the procedure used to develop the scale is found in Section 2, which follows.

Results are presented in percentages, unless otherwise stated. Each table indicates whether percentages are based on the entire sample or on a sub-group. Base figures (denominators) are given as absolute numbers.

SECTION 2

CHARACTERISTICS OF RESPONDENTS AND HOUSEHOLDS

This section provides descriptive information on respondents and households in the sample. It also provides information on socio-economic status (SES) variables, which were combined to create a five-point SES scale.

The scale was calculated as follows: Categorical variables were re-coded to become pseudo-ordinal variables, and categories that were judged to be equivalent in terms of SES were combined to increase the frequency of responses. Principal component analysis was used to extract the main, single factor that accounted for the largest amount of variance in the data. Using the factor scores from the principal component analysis, respondents were divided into 10 groups based on the deciles of the factor scores. To assure adequate cell sizes, these ten groups were collapsed into a five point scale, so that each SES level has approximately 20% of the sample in it. In this scale, "1" indicates the lowest SES group and "5" indicates the highest.

2.1 CHARACTERISTICS OF RESPONDENTS

Table 3: Characteristics of respondents
Among all respondents

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Age of Respondent												
15-19	4.2	1	2.5	3.5	11.5	2.5	5.3	3.3	4.3	4.8	3.8	
20-29	51.0	56.5	45.5	58.3	55	39.5	53.8	42.6	56	44.9	55	
30-39	38.0	39.5	43.5	31.7	31.5	44	41.3	43.6	34.3	43.1	34.7	
40-49	6.8	3	8.5	6.5	2	14	2.5	8.5	6.3	7.3	6.5	
Education Level of Respondent (years)												
0	25.7	15.5	15.5	28.6	51	18	8.8	19.4	29.7	33	17.3	31.3
1-5	3	2	2.5	2.5	2	6	0	3.4	2.7	3.7	2.8	3.2
6-12	62.8	77	72	63.8	38	63	86.3	62.4	60.7	59	67.2	59.8
13+	8.5	5.5	10	5	9	13	5	14.7	7	4.3	12.8	5.7
Mean (among those with schooling)	9.31	9.54	9.09	9.17	9.91	9.07	10.63	10.04	8.94	8.29	10.17	8.62
Language of Interview												
English	53.1	39.5	27.5	43.2	76.0	79.0	57.5	73.7	46.0	37.0	70.4	41.5
Yoruba	26.6	60.5	72.5	0	0	0	42.5	12.2	30.7	33.7	18.3	32.2
Ibo	4.3	0	0	0.5	0	21.0	0	4.4	4.3	5.3	3.5	4.8
Hausa	16.0	0	0	56.3	24.0	0	0	9.7	19	24	7.8	21.5

2.2 CHARACTERISTICS OF HOUSEHOLDS

Table 4: Household composition

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Number of household members per household (mean)	4.8	4.55	4.36	5.36	5.09	4.68	4.41	4.87	4.73	4.91	4.78	4.82
Number of women of reproductive age in household per household (mean)	1.14	1.1	1.1	1.21	1.14	1.15	1.19	1.17	1.1	1.13	1.18	1.12
Number of children under age 5 per household (mean)	1.59	1.73	1.47	1.61	1.67	1.48	1.46	1.48	1.62	1.71	1.48	1.67

Table 5: Age distribution of household members

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	4800	910	871	1067	1017	935	353	1553	1420	1474	1906	2894
0-<1	2.3	2.4	4.2	0.5	0.6	4.5	4.5	2.4	2.3	1.8	2.8	2
1-<2	4.9	7.8	5.6	1.9	5.3	4.6	7.4	4.1	5.1	5.1	4.7	5.1
2-<3	6.1	7.6	4.5	5	7.3	6.3	7.1	5.8	5.9	6.4	6	6.2
3-<4	7.2	8	7.6	8.7	5.9	5.7	5.9	6.7	7.4	7.8	6.6	7.6
4-<5	8.6	6.5	8.4	9.2	10.2	8.4	5.4	8.6	8.7	9.3	8	9
5-14	24.2	19.8	20.1	30.4	26.4	22.9	16.7	25.2	24.8	24.3	23.7	24.6
15-49	44.2	47	48.2	41.7	42.9	41.8	52.1	44.9	43.2	42.4	46.2	42.8
50+	2.4	0.9	1.4	2.7	1.3	5.8	0.8	2.2	2.5	2.9	1.9	2.7

2.3 SOCIO-ECONOMIC DESCRIPTORS

Table 6: SES indicators

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Employment of main wage earner												
Regular	55.6	58.5	32.5	54.3	50.5	82	72.5	68.3	49.7	43.3	69.2	46.5
Seasonal	31.4	22.5	65.5	17.6	38	13.5	17.5	23.5	36.7	38.3	22.3	37.5
Casual	11.7	18	1.5	25.1	11	3	8.8	6	13	17.3	6.5	15.2
Main wage earner's years of schooling												
0	14.4	7.5	4.5	15.6	32	12.5	6.3	10	15	20.7	9.3	17.8
1-5	1.1	0.5	0	0	1.5	3.5	0	0.9	2	0.7	0.8	1.3
6-12	53.5	69.5	71	36.2	25	65.5	61.3	44.5	60	54.3	47.9	57.2
13+	18.9	21	14.5	23.1	23	13	31.3	29.5	13.3	10	29.8	11.7
Don't know	10.2	0.5	8	20.6	18	4	0	14.1	8	11	11.3	9.5
Household items												
Electricity	79.7	88	75	97.5	91.5	46.5	98.8	90.9	79.7	62.7	92.5	71.2
A radio	84.8	93	95	96	84.5	55.5	96.3	92.8	82.7	75.3	93.5	79
A television	53.7	72	62.5	58.8	55	20	93.8	71.5	51.7	26	75.9	38.8
A telephone/Cell phone	3.9	2	1.5	7.5	7.5	1	5	7.2	3.7	0.3	6.8	2
A refrigerator	25.5	40.5	19	31.2	31.5	5.5	68.8	41.4	16	6.7	46.9	11.3
A bicycle	11.8	4.5	5.5	12.1	6	31	3.8	8.8	15	14	7.8	14.5
A motorcycle	10.5	2.5	3.5	9.5	9	28	3.8	13.2	9	11	11.3	10
A car or truck	8.7	10.5	4.5	13.1	13.5	2	12.5	14.4	7.3	3	14	5.2
An animal-drawn plough	1.5	0	0	2.5	5	0	0	0	1.7	3.3	0	2.5
Windows with mosquito screens	12.3	33.5	11	11.6	2.5	3	50	14.4	7.3	5	21.6	6.2
Energy source for cooking												
Electricity	1.4	2.5	1.5	2.5	0	0.5	3.8	2.2	0.7	0.7	2.5	0.7
LPG/natural gas	1.3	1	1	1.5	2.5	0.5	0	3.1	0.7	0.3	2.5	0.5
Biogas	0.5	0	0	1.5	1	0	0	1.6	0	0	1.3	0
Kerosene/Paraffin	42.4	66	61	39.7	31	14.5	93.8	56.1	35	21.7	63.7	28.3
Coal/lignite	0.2	0.5	0	0	0.5	0	1.3	0	0.3	0	0.3	0.2
Charcoal	2.6	1.5	2	3	6.5	0	0	1.6	5.3	1.7	1.3	3.5
Firewood/straw	51.2	28	34.5	51.3	58	84	1.3	35.4	57	75.3	28.6	66.2
Dung	0.1	0	0	0	0	0.5	0	0	0.3	0	0	0.2

Table 6: SES indicators (continued)

	Site					Location				Urban/Rural		
	Total	Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Source of drinking water												
Piped Water												
Piped into home or plot	14.0	9	5.5	29.6	19	7	17.5	22.9	11	6.7	21.8	8.8
Public tap	29.1	42.5	19	13.1	36.5	34.5	57.5	39.5	27.7	12	43.1	19.8
Well water												
Well in residence/plot	10.3	3.5	7.5	23.6	14.5	2.5	1.3	4.7	11	18	4	14.5
Public shallow well	15.9	26.5	28	12.1	12	1	6.3	3.8	17.7	29.7	4.3	23.7
Public bore hole	16.8	12	29.5	20.1	16	6.5	17.5	16.6	20.7	13	16.8	16.8
Surface Water												
Spring	1.2	0.5	0	0	0	5.5	0	0.3	0.3	3.3	0.3	1.8
River/stream	5.6	6	7	1	0	14	0	4.1	2	12.3	3.3	7.2
Pond/lake	0.4	0	0	0	2	0	0	0	1.3	0	0	0.7
Tanker truck	1.8	0	1.5	0	0	7.5	0	2.2	1	2.7	1.8	1.8
Rainwater	4.8	0	2	0.5	0	21.5	0	6	7.3	2.3	4.8	4.8
Sanitation facility												
Flush toilet												
Own flush toilet	10.0	2.5	8	19.6	18	2	2.5	21.6	6.3	3.3	17.8	4.8
Shared flush toilet	14.9	38.5	22.5	5.5	7	1	71.3	16.6	10.7	2.3	27.6	6.5
Pit toilet/ latrine												
Traditional pit latrine	54.2	41.5	48.5	51.3	71.5	58	23.8	42.9	60.7	67.7	39.1	64.2
Ventilated improved pit latrine	10.9	1.5	8	21.1	2.5	21.5	2.5	15.7	9.7	9.3	13	9.5
No facility/bush/field	8.8	11	12.5	2	1	17.5	0	2.8	9	17.3	2.3	13.2
Other												
In the Sea/River	1	5	0	0	0	0	0	0	3.3	0	0	1.7
Main material of floor												
Natural floor												
Earth/sand	14.3	13	12.5	1.5	34	10.5	1.3	7.8	21.3	17.7	6.5	19.5
Dung	0	0	0	0	0	0	0	0	0	0	0	0
Rudimentary floor												
Wood planks	0	0	0	0	0	0	0	0	0	0	0	0
Palm/bamboo	0.1	0	0	0.5	0	0	0	0	0.3	0	0	0.2
Finished floor												
Parquet or polished wood	0.2	0.5	0.5	0	0	0	0	0.3	0.3	0	0.3	0.2
Vinyl or asphalt strips	36.2	49	51.5	34.2	28.5	18	48.8	47	30	27.7	47.4	28.8
Ceramic tiles	1.7	0	0.5	6	1.5	0.5	0	4.4	0.7	0.3	3.5	0.5
Cement	35.4	3.5	29.5	47.7	27	69.5	5	30.1	36.3	48.3	25.1	42.3
Carpet (not loose or scattered)	12.0	34	5.5	10.1	9	1.5	45	10.3	11	6	17.3	8.5

Table 7: Distribution of SES levels

	Site					Location				Urban/Rural		
	Total	Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
1 (N = 195) LOW	19.5	10	17	3.5	23	44	0	6.6	19	39	5.3	29
2 (N = 204)	20.4	11	17.5	25.6	23	25	0	13.8	26.3	27	11	26.7
3 (N = 201)	20.1	15.5	20	27.6	17	20.5	6.3	20.1	24	20	17.3	22
4 (N = 200)	20.0	27	31.5	17.1	16.5	8	26.3	28.2	19.3	10.3	27.8	14.8
5 (N = 199) HIGH	19.9	36.5	14	26.1	20.5	2.5	67.5	31.3	11.3	3.7	38.6	7.5

SECTION 3

KNOWLEDGE AND BELIEFS ABOUT MALARIA AND MOSQUITOES

The study sought to find out whether respondents had heard of the English term “malaria,” what their level of knowledge about the symptoms and causes were, whether they knew what groups are most vulnerable to severe malaria, and whether they had received any information on avoiding malaria within the past year. Respondents were also asked when they are most bothered by mosquitoes.

3.1 RECOGNITION OF THE TERM “MALARIA”

Respondents were asked whether they had heard of the English term “malaria” in order to find out the extent to which the term can be used in promotion activities. Use of a single term around which promotion activities could take place would be important in building common, accurate understanding of the term and the illness.

- Recognition of the term was extremely high: the great majority of respondents (94%) reported having heard of “malaria.”
- Recognition of the term malaria was somewhat higher overall in the South—Ibadan site (100%), Lagos site (97%), and Nsukka site (93%)—than in the North—Maiduguri site (89%) and Kano site (91%).
- Recognition of the term malaria was higher in urban (99%) than rural (91%) areas and decreased with distance from the urban centers.

Table 8: Recognition of English term “malaria”
Among all respondents

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu- guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Yes	93.9	96.5	100	91	89	93	98.8	98.4	94	87.7	98.5	90.8
No	6.1	3.5	0	9	11	7	1.3	1.6	6	12.3	1.5	9.2

3.2 PERCEIVED SYMPTOMS AND CAUSES OF MALARIA

Malaria can exhibit a diverse set of symptoms, but fever is common to all symptomatic cases. In order to determine the extent to which respondent perceptions of malaria coincided with the biomedical concepts of the illness, respondents were asked what the symptoms and causes of malaria were.

- Most respondents mentioned fever or its manifestations: the main symptoms mentioned were “fever/hot body” (62%), “headache” (51%), “weakness” (36%), “feeling cold/chills” (29%), and “body aches/joint pain” (17%). Only 1% mentioned “convulsions/fits”, a symptom of severe malaria.
- The great majority of respondents who had heard of malaria knew that mosquitoes cause malaria (81%). However only 29% named *only* mosquitoes as the cause; 68% erroneously believed that there were additional causes of malaria as well, and 16% thought malaria was caused *only* by factors other than mosquitoes. Other factors thought to cause malaria were “getting hot/sun overexposure” (30%), “overwork” (19%), “dirty surroundings” (18%) and “drinking dirty water” (15%).

Table 9: Perceived symptoms of malaria
Among respondents who have heard of malaria (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Fever	61.9	58	71.5	66.3	81.5	32.8	72.2	61.5	60.6	60.8	63.6	60.7
Chills/shivering	29.0	22.8	38.5	26	27.5	29.6	19	29	28.7	32.3	27	30.5
Cough	10.2	10.9	11.5	12.2	9	7.5	12.7	11.5	11.3	6.8	11.7	9.2
Headache	50.6	59.6	63.5	44.2	33.7	50	63.3	51.3	50.4	46.4	53.7	48.4
Nausea or vomiting	8.6	7.3	3.5	11	15.2	7	7.6	9.2	7.4	9.5	8.9	8.4
Diarrhea	2.5	1.6	0.5	7.7	2.8	0	0	3.2	3.5	1.1	2.5	2.4
Dizziness	9.9	9.8	2.5	15.5	6.2	16.1	10.1	11.5	8.5	9.5	11.2	9
Loss of appetite	18.9	22.8	15	21	16.3	19.4	20.3	18.5	18.8	19	18.8	18.9
Body ache or joint pain	16.5	18.7	22	17.1	12.9	11.3	12.7	16.6	16	18.3	15.8	17.1
Pale eyes or palms	8.0	11.4	2.5	12.7	4.5	9.1	8.9	7.3	7.1	9.5	7.6	8.3
Convulsions/fits	1.0	0.5	0.5	0.6	2.2	1.1	0	0.6	0.7	1.9	0.5	1.3
Weakness	35.9	29	40	19.9	31.5	58.6	26.6	32.8	38.7	39.5	31.6	39.1
Rash	1.8	4.1	0	3.3	0	1.6	3.8	1	2.1	1.9	1.5	2
Other	6.2	13.5	3.5	0.6	0	12.9	11.4	5.1	4.3	8	6.4	6.1
Don't know	0.6	1	0	1.7	0	0.5	1.3	0.6	1.1	0	0.8	0.6

Table 10: Perceived causes of malaria
Among respondents who have heard of malaria (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Mosquitoes	80.5	72	88.5	86.7	89.9	65.6	82.3	82.5	79.4	78.7	82.4	79.1
Being in the rain	5.1	3.6	5	8.3	8.4	0.5	0	5.7	7.1	3.8	4.6	5.5
Getting cold	4.5	3.6	8.5	6.1	2.2	1.6	2.5	4.5	5	4.6	4.1	4.8
Getting hot/sun overexposure	29.9	39.9	41.5	14.4	10.1	40.9	29.1	23.2	29.4	38.4	24.4	33.8
Drinking dirty water	14.5	22.3	7	16	22.5	5.4	25.3	14.6	14.5	11	16.8	12.8
Eating cold or dirty food	5.4	11.9	4	3.9	6.7	0.5	17.7	4.1	5	3.8	6.9	4.4
Overwork	19.1	33.7	38	4.4	1.7	14.5	17.7	13.4	20.9	24.3	14.2	22.6
God/Allah	2.8	1.6	1	3.3	7.9	0.5	1.3	1.9	2.1	4.9	1.8	3.5
Another person with malaria	1.1	1	0.5	0.6	2.2	1.1	1.3	0.6	1.8	0.8	0.8	1.3
Dirty surroundings	18.0	22.3	11.5	23.2	29.8	4.3	26.6	20.1	18.8	12.2	21.4	15.6
Standing water	4.7	1.6	2	13.8	5.1	1.6	0	5.7	5.7	3.8	4.6	4.8
Other	4.8	2.6	1.5	0	0.6	19.4	1.3	6.7	3.9	4.6	5.6	4.2
Don't know	3.2	2.1	1.5	1.7	0.6	10.2	2.5	4.5	2.8	2.3	4.1	2.6

Table 11: Knowledge that mosquitoes are the only cause of malaria
Among respondents who have heard of malaria

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Mosquitoes only	28.5	15.0	19.5	44.8	36.0	29.0	20.3	30.6	29.4	27.4	28.5	28.4
Mosquitoes and other causes	52.0	57.0	69.0	42.0	53.9	36.6	62.0	51.9	50.0	51.3	53.9	50.6
Other causes only	16.3	25.9	10.0	11.6	9.6	24.2	15.2	13.1	17.7	19.0	13.5	18.3
Don't know	3.2	2.1	1.5	1.7	0.6	10.2	2.5	4.5	2.8	2.3	4.1	2.6

3.3 KNOWLEDGE OF VULNERABLE GROUPS

In order to measure knowledge of vulnerable groups—children under five and pregnant women—respondents who recognized the term malaria were shown a page with drawings of five household members: a man, a woman (not pregnant), a pregnant woman, a child of age 3, and a child of age 6. They were asked to select the person most vulnerable to a serious case of malaria and to then select, among those remaining, who else is most vulnerable.

- Just over half (55%) selected the two correct drawings: that of the young child and the pregnant woman. Knowledge of vulnerable groups was higher in urban (61%) than in rural (51%) areas and decreased with distance from the urban centers. Knowledge was also highest in the South – Ibadan site (76%), Lagos site (58%), Nsukka site (52%) – and lowest in the North – Maiduguri site (43%) and Kano site (45%).
- Forty-eight percent (48%) included in their selection a household member who was not among the most vulnerable: 31% selected the child of 6 years; 8% selected the woman; and 7% selected the man.

Table 12: Selection of vulnerable groups

Among respondents who have heard of malaria (two responses per person)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Man	7.2	5.7	2	3.9	2.8	22	3.8	7.3	5.3	10.3	6.6	7.7
Woman	7.9	8.8	4	8.8	10.1	8.1	6.3	7	8.5	8.7	6.9	8.6
Pregnant woman	66.4	69.4	81	56.4	53.4	69.9	79.7	67.2	63.1	65	69.7	64
Child of 6 years	31.3	26.9	17	46.4	44.9	23.7	16.5	30.6	34.4	33.5	27.7	33.9
Child of 3 years	83.8	86.5	95	79	86.5	71	88.6	84.1	85.5	80.2	85	82.9

Table 13: Knowledge of vulnerable groups

Among respondents who have heard of malaria

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Knows vulnerable groups (Pregnant woman and child under 5)	55.3	58	76	44.8	43.3	52.2	69.6	58.6	53.5	49	60.8	51.4
Does not know vulnerable groups	44.7	42	24	55.2	56.7	47.8	30.4	41.4	46.5	51	39.2	48.6

3.4 EXPOSURE TO INFORMATION ON AVOIDING MALARIA

In order to obtain a general idea of the extent to which people are currently being given information about preventing malaria, respondents who had heard of “malaria” were asked whether they had seen or heard any information about preventing malaria in the past year. Those who had seen/heard something were asked where they heard it.

- Over half (60%) of the respondents who had heard of malaria reported that they had not received any information about avoiding malaria in the past twelve months. In addition, 24% of rural residents and 11% of urban residents had heard information *only* from non-professionals (friends, neighbors or relatives), rather than from more professional and presumably more reliable sources.
- There was great variation by site in the proportion of respondents (among those who had heard of malaria) who had received information in the past 12 months, ranging from 12% in Ibadan site to 62% in Kano.
- The proportion of those receiving information about malaria decreased with distance from the urban centers.
- Of those respondents who had heard information about avoiding malaria 37% heard information from staff/personnel in health facilities; 33% from neighbors or friends; 26% from the radio; and 21% from TV.
- TV was mentioned as a source for malaria information by a higher percentage of urban (33%) than rural (10%) households, whereas “friends/neighbors/relatives” was mentioned as a source by a higher percentage of rural (41%) than urban (33%) households.

Table 14: Exposure to information on avoiding malaria
Among respondents who have heard of malaria

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	938	193	200	181	178	186	79	314	282	263	393	545
Yes	39.9	52.3	11.5	62.4	57.9	18.3	54.4	42.4	40.1	32.3	44.8	36.3
No	60.1	47.7	88.5	37.6	42.1	81.7	45.6	57.6	59.9	67.7	55.2	63.7

Table 15: Exposure to information on avoiding malaria, by source
Among respondents who have seen/heard information about malaria in the 12 months prior to the interview (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	374	101	23	113	103	34	43	133	113	85	176	198
Radio	25.9	11.9	52.2	38.1	18.4	32.4	16.3	32.3	22.1	25.9	28.4	23.7
Television	20.6	13.9	21.7	27.4	25.2	2.9	27.9	34.6	9.7	9.4	33	9.6
Newspaper/magazine	5.1	2	8.7	6.2	5.8	5.9	2.3	9	2.7	3.5	7.4	3
Staff at shop/pharmacy/market	4.0	2	0	8	3.9	0	2.3	4.5	4.4	3.5	4	4
Poster/notice at shop/pharmacy/market	3.7	2	0	8	2.9	0	4.7	4.5	2.7	3.5	4.5	3
Health staff/ personnel	36.6	41.6	17.4	31	36.9	52.9	51.2	31.6	37.2	36.5	36.4	36.9
Poster/notice at health facility	10.7	7.9	17.4	15.9	4.9	14.7	7	14.3	9.7	8.2	12.5	9.1
Church/mosque	1.1	2	0	0	1	2.9	0	0	1.8	2.4	0	2
School	2.9	1	0	0.9	5.8	8.8	2.3	3.8	2.7	2.4	3.4	2.5
Drama Group	1.3	0	0	0	4.9	0	0	3.8	0	0	2.8	0
Friends/Neighbors/Relatives	32.9	43.6	13	15.9	55.3	2.9	34.9	19.5	47.8	32.9	23.3	41.4
Other	0.3	0	0	0	0	2.9	0	0.8	0	0	0.6	0
Don't know	2.4	0	0	7.1	0	2.9	0	3.8	0.9	3.5	2.8	2

Table 16: Exposure to information from “non-professional” and “professional” sources
Among respondents who have seen/heard information about malaria in the 12 months prior to the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	374	101	23	113	103	34	43	133	113	85	176	198
“Non-professional” sources only	18.2	33.7	4.3	3.5	28.2	0	25.6	6.8	29.2	17.6	11.4	24.2
“Non-professional” and “professional” sources	14.7	9.9	8.7	12.4	27.2	2.9	9.3	12.8	18.6	15.3	11.9	17.2
“Professional” sources only	64.7	56.4	87.0	77.0	44.7	94.1	65.1	76.7	51.3	63.5	73.9	56.6
Don't know	2.4	0	0	7.1	0	2.9	0	3.8	.9	3.5	2.8	2.0

3.5 MOSQUITO BITING PATTERNS

- When asked what time(s) of the day mosquitoes bite them the most, the vast majority of respondents (81%) said at night when they are sleeping and almost half (47%) mentioned evening or night before sleeping.

Table 17: Time of day when mosquitoes bother or bite the most
Among all respondents (multiple responses possible)

	Site					Location				Urban/Rural		
	Total	Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Morning	2.6	2.5	1	6.5	1	2	0	1.3	5.3	2	1	3.7
Afternoon	2.0	1.5	3.5	0.5	2	2.5	1.3	2.5	1.7	2	2.3	1.8
Evening or night before sleeping	47.2	44	31	43.2	49.5	68.5	42.5	49.2	48.7	45	47.9	46.8
At night when sleeping	80.9	83	88	69.8	89.5	74	81.3	80.9	78.7	83	81	80.8
All day long	6.5	10	6	7	7.5	2	10	3.4	7.3	8	4.8	7.7
Don't know	0.1	0	0	0.5	0	0	0	0	0	0.3	0	0.2

SECTION 4

MOSQUITO NETS

4.1 PERCEIVED ADVANTAGES AND DISADVANTAGES OF NET USE BY VULNERABLE GROUPS

Children under five and pregnant women are the most vulnerable to getting a serious case of malaria, and a key measure of the success of NetMark will be whether it achieves gains in the proportions of these vulnerable groups regularly sleeping under a treated net. All respondents, whether net owners or not, were asked (unprompted) what advantages and disadvantages they saw in a child under five sleeping under a net, in a child under five sleeping under a *treated* net, and in a pregnant woman sleeping under a *treated* net. NetMark qualitative research showed that perceived advantages/disadvantages for children under five and for pregnant women differed; therefore each of those groups was asked about separately. Further, questions about advantages/disadvantages of “sleeping under a net” were separated from the questions about “sleeping under a treated net” since qualitative research showed that the perceived benefits of and barriers to sleeping under a net were different from those for sleeping under an insecticide-treated net. Responses were unprompted and multiple responses were accepted.

Since many people may not have heard of sleeping under a treated net, it was necessary to introduce the concept before asking for a reaction to it. Before being asked about perceptions of sleeping under a treated net, each respondent was told that a treated net was one that had been dipped or sprayed with insecticide. Then the questions about advantages and disadvantages were asked.

Given that perceptions may differ among those who are familiar with using nets and those who are not, in the tables that follow, the data for the “advantages and disadvantages” questions are further broken down by net owners and non-owners.

Advantages of sleeping under a mosquito net for child under five

- Almost all respondents (98%) named at least one advantage for a child under five sleeping under a mosquito net.
- The most commonly mentioned advantage of a child under five sleeping under a mosquito net was to “avoid getting bitten by mosquitoes” (79%). The second most frequently mentioned benefit was to “avoid getting ‘malaria’” (25%), with another 6% saying an advantage was to “avoid getting [local term for malaria]”, bringing the total to 31% mentioning avoiding this illness. Another commonly mentioned advantage was to “sleep better” (19%).
- The idea that nets can help avoid getting malaria (whether the term was stated in English or a local language) was mentioned as an advantage by a far higher percentage of respondents in Lagos proper (49%) than in far rural areas (26%).
- There were no large differences between urban and rural respondents or net-owners and non-owners in any advantages mentioned

Table 18: Perceived advantages of sleeping under a mosquito net for child under five
Among all respondents (multiple responses possible)

	Site					Location				Urban/Rural		Net Ownership		
	Total	Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Avoid getting bitten by mosquitoes	78.5	82.5	76	72.4	69.5	92	86.3	78.4	76.3	78.7	79.9	77.5	79.2	78.4
Avoid getting "malaria"	25.3	32.5	16.5	25.6	27.5	24.5	42.5	25.4	28.3	17.7	28.8	23	30.8	24.6
Avoid getting [local term for malaria]	5.8	15	12	0	1	1	6.3	1.9	7.3	8.3	2.8	7.8	4.2	6
Don't get bothered by other insects/other pests	8.9	4	8.5	4	13	15	1.3	10.7	7.7	10.3	8.8	9	10	8.8
Sleep better	18.5	22	16	20.1	30.5	4	20	16.3	20.7	18.3	17	19.5	21.7	18.1
Warmer/gives warmth	5.3	5	3	4	8.5	6	1.3	4.4	5.7	7	3.8	6.3	1.7	5.8
Protects against dust/dirt	5.6	3.5	2	6.5	15.5	0.5	2.5	8.2	5.3	4	7	4.7	5	5.7
Gives privacy	4.2	1.5	9.5	2.5	7.5	0	1.3	6	5.3	2	5	3.7	2.5	4.4
Saves money/time because child not sick	4.7	10	0.5	5	5.5	2.5	12.5	4.1	5	3	5.8	4	5.8	4.6
Is an economical/lasting solution	2.8	1	0	3.5	9	0.5	2.5	3.1	3.3	2	3	2.7	5.8	2.4
Other	0.3	0	0	0	0	1.5	0	0.6	0.3	0	0.5	0.2	0.8	0.2
None	0.4	0.5	0	0.5	1	0	0	0.6	0	0.7	0.5	0.3	0	0.5
Don't know	1.5	1.5	1.5	2.5	1	1	1.3	0.9	1	2.7	1	1.8	1.7	1.5

Disadvantages of sleeping under a mosquito net for child under five

- About 1/3 of respondents (32%) did not cite any disadvantage ("none" or "don't know any") of a child under five sleeping under a mosquito net: 18% said there were no disadvantages; 14% said that they did not know of a disadvantage.
- The most commonly mentioned disadvantages for a child under five sleeping under a mosquito net were "it is hot sleeping under a net" (27%); "it is difficult/inconvenient if the child has to get up in the night" (11%); "there is not enough air under the net" (10%); "child may suffocate" under the net (8%); and "child may tear the net" (8%).
- There were no large differences between urban and rural respondents or net-owners and non-owners in any disadvantages mentioned, although a somewhat higher proportion of net owners, mostly from Nsukka, felt that nets are hot and that a child might suffocate.

Table 19: Perceived disadvantages of sleeping under a mosquito net for child under five
Among all respondents (multiple responses possible)

	Site					Location				Urban/Rural		Net Ownership		
	Total	Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Hot sleeping under a net	26.5	8.5	15.0	29.6	31.5	48	10	29.2	27.7	27	25.3	27.3	32.5	25.7
Mosquitoes can still bite through the net	4.5	2.5	1.5	9.0	8.0	1.5	1.3	3.4	5.7	5.3	3	5.5	5.0	4.4
Mosquitoes can still get in the net	5.3	8.5	0.5	8.5	9.0	0	6.3	3.8	8.3	3.7	4.3	6.0	7.5	5
Mosquitoes still make noise	4.1	6.5	2	6.5	5.5	0	7.5	3.8	4	3.7	4.5	3.8	3.3	4.2
Difficult/inconvenient if child has to get up in the night	10.7	23	12	9.5	5.0	4.0	25.0	10.0	9.3	9.0	13.0	9.2	10.0	10.8
Takes time to tuck in the net	3.2	7.5	1.5	2.5	4.5	0	8.8	1.9	2.7	3.7	3.3	3.2	3.3	3.2
Not enough air under the net	9.9	24	5	6.5	6.0	8.0	22.5	6.3	10.3	10	9.5	10.2	11.7	9.7
Child might suffocate	8.3	2.5	1.5	18.6	8.0	11.0	5	13.5	6	6	11.8	6.0	16.7	7.2
Child may tear net	8.2	12.5	7.5	8.0	11.0	2.0	13.8	7.8	7.7	7.7	9	7.7	8.3	8.2
Child might get caught/trapped	4.9	6.5	1	5.0	8.5	3.5	5	4.4	6.7	3.7	4.5	5.2	2.5	5.2
Child will get used to net and won't be able to sleep without it	3.2	3.5	0.5	5.0	5.0	2.0	3.8	4.4	4	1	4.3	2.5	5.8	2.8
Too expensive/can't afford net	6.6	2.5	8.5	5.0	15.5	1.5	3.8	6.9	6	7.7	6.3	6.8	3.3	7.1
Other	1.1	2.0	0	1.0	0	2.5	0	1.9	0	1.7	1.5	0.8	5.8	0.5
None	17.9	18.5	34.5	3.5	22.5	10.5	22.5	16	19.7	17	17.3	18.3	16.7	18.1
Don't know	13.7	5.0	23.0	15.6	8.0	17	1.3	13.2	13	18.3	10.8	15.7	7.5	14.6

Advantages of sleeping under a *treated* net for child under five

- Almost all respondents (95%) named at least one advantage for a child under five sleeping under a *treated* net.
- The most commonly cited advantages of a child sleeping under a treated net had to do with its greater efficacy than an untreated one: “kills mosquitoes” (48%); “works better against mosquitoes than an untreated net” (39%); “repels mosquitoes” (20%); and “child is more protected” (13%). Twenty percent (20%) specifically mentioned that it is better at preventing malaria, using either the English term “malaria” (17%) or its equivalent in a local language (3%).

Table 20: Perceived advantages of sleeping under a treated mosquito net for child under five
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural		Net Ownership	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Works better against mosquitoes than an untreated net	39.2	42.5	48.5	35.7	35.0	34.5	36.3	42.0	33.3	43.0	40.9	38.2	43.3	38.7
Kills mosquitoes	47.6	63.5	52	46.7	38.0	38.0	70.0	40.4	45.0	52.0	46.4	48.5	41.7	48.5
Repels mosquitoes away from net	19.6	11.5	10	21.1	38.5	17.0	5.0	21.3	21.3	20.0	18	20.7	27.5	18.5
Kills/repels other insects or pests	8.3	9	8	7.5	9.5	7.5	3.8	10.3	7.3	8.3	9	7.8	5.8	8.6
Is better at preventing “malaria”	16.9	20	13	20.6	24.0	7	32.5	18.2	19	9.3	21.1	14.2	16.7	17.0
Is better at preventing [local term for malaria]	3.0	7.0	7.5	0	0	0.5	7.5	0.9	3.0	4.0	2.3	3.5	2.5	3.1
Child is more protected	13.1	12.0	12.0	6.5	24.5	10.5	16.3	12.9	14.7	11.0	13.5	12.8	10.8	13.4
Save more money/time because child is not sick	4.3	3.5	1.0	4.5	7.0	5.5	3.8	5	5	3.0	4.8	4.0	6.7	4.0
Other	0.3	0	0	0	0	1.5	0	0.6	0.3	0	0.5	0.2	0	0.3
None	1.6	2.0	4.5	0	1.5	0	1.3	1.9	1.7	1.3	1.8	1.5	0	1.8
Don't know	3.3	0.5	1.0	3.5	3.0	8.5	0	5.3	2.3	3	4.3	2.7	3.3	3.3

Disadvantages of sleeping under a *treated* net for child under five

- Thirty-nine percent (39%) of respondents did not cite any disadvantage (“none” or “don’t know any”) for a child under five to sleep under a *treated* net: 21% said there were no disadvantages; 18% said that they did not know of a disadvantage.
- The most commonly mentioned disadvantages of a child under five sleeping under a *treated* net had to do with concerns about the safety of the chemical: 23% said the chemical could cause cough, irritation, or other illness. Others expressed their concerns in stronger terms, saying that the chemical is dangerous (18%) or even that it can kill the child (9%). Seventeen percent (17%) said that a disadvantage would be a bad smell.

Table 21: Perceived disadvantages of sleeping under a treated mosquito net for child under five
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural		Net Ownership	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Insecticide is not effective	2.4	2.0	0.5	3.0	6.0	0.5	1.3	2.8	2.0	2.7	2.5	2.3	5.8	1.9
Smell is bad	16.7	12.0	13.5	13.1	17.0	28.0	17.5	16.3	17.0	16.7	16.5	16.8	21.7	16.0
Causes irritation/cough	12.6	15.0	5.0	24.6	13.5	5.0	12.5	13.5	14.3	10.0	13.3	12.2	13.3	12.5
Causes other illness	10.5	4.0	5.0	17.1	19.0	7.5	3.8	9.7	11.3	12.3	8.5	11.8	10.8	10.5
Child might chew/suck net	5.9	9.0	6.0	1.0	7.5	6.0	11.3	5.6	3.7	7.0	6.8	5.3	5.8	5.9
Chemical is dangerous	17.5	12.5	21.0	15.6	18.0	20.5	11.3	23.5	17.7	12.7	21.1	15.2	24.2	16.6
Chemical can kill child	8.5	2.0	7.5	12.6	11.0	9.5	2.5	10.3	10.3	6.3	8.8	8.3	10.8	8.2
Treated net can't be washed	8.0	6.0	7.0	12.1	12.5	2.5	8.8	8.2	11	4.7	8.3	7.8	8.3	8.0
Treated net gets dirty	1.8	1.5	0	4.0	3.5	0	0	3.8	1.7	0.3	3.0	1.0	2.5	1.7
Other	2.0	0	0	0	0	10.0	0	4.1	0.7	1.7	3.3	1.2	3.3	1.8
None	17.5	31.0	26.5	1.0	20.0	9.0	35.0	13.8	18.3	16.0	18.0	17.2	10.0	18.5
Don't know	21.0	15.5	22.5	27.6	17.5	22	7.5	17.9	20	29	15.8	24.5	16.7	21.6

Advantages of sleeping under a *treated* net for a pregnant woman

- Almost all respondents (94%) named at least one advantage for a pregnant woman sleeping under a *treated* net.
- The most commonly mentioned advantages for a pregnant woman sleeping under a *treated* net had to do with its greater efficacy against mosquitoes than an untreated one—that it “kills mosquitoes” (44%), “works better against mosquitoes than an untreated net” (38%), “repels mosquitoes” (19%). Another 17% mentioned the general idea of greater protection for a pregnant woman; 18% specifically noted better protection against malaria, either expressing the idea using the term “malaria” or a local term for the illness; and 3% specifically cited greater protection against miscarriage or stillbirth.

Table 22: Perceived advantages of sleeping under a treated mosquito net for pregnant woman
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural		Net Ownership	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Works better against mosquitoes than untreated net	38.1	41	46.5	34.2	33.5	35.5	35	36.1	37.3	42	35.8	39.7	40	37.9
Kills mosquitoes	44.2	61.5	49.5	42.2	33.5	34.5	57.5	35.7	43.7	50.3	40.1	47	39.2	44.9
Repels mosquitoes away from net	19.1	10.5	13.5	22.6	37.0	12.0	7.5	21.3	22	17	18.5	19.5	28.3	17.9
Kills/repels other insects or pests	6.9	6.0	5.5	11.6	8.5	3.0	1.3	10.7	4.3	7.0	8.8	5.7	6.7	6.9
Is better at preventing malaria	14.1	19.0	7.0	11.1	20.5	13.0	33.8	15	12.7	9.3	18.8	11	13.3	14.2
Is better at preventing [local name for malaria]	3.9	9.0	8.5	0.5	1	0.5	8.8	1.6	3.7	5.3	3	4.5	3.3	4.0
Is better at preventing miscarriage/stillbirth	3.2	1.0	0	7.5	7.5	0	1.3	4.1	4.3	1.7	3.5	3.0	3.3	3.2
Pregnant woman is more protected	16.5	23.5	13.5	14.6	20	11	31.3	14.4	14.7	16.7	17.8	15.7	19.2	16.2
Save more money/time because pregnant woman is not sick	4.3	4.5	1	3	8	5	5	4.7	5.7	2.3	4.8	4	6.7	4
Other	0.7	0	0	0	0	3.5	0	1.6	0.3	0.3	1.3	0.3	1.7	0.6
None	3.0	2.5	10.0	0	2.5	0	0	2.8	5.0	2.0	2.3	3.5	0	3.4
Don't know	3.4	1	1	3	3.5	8.5	1.3	6	2.3	2.3	5	2.3	2.5	3.5

Disadvantages of sleeping under a *treated* net for pregnant woman

- About one-third (35%) of respondents did not cite any disadvantage (“none” or “don’t know any”) of a pregnant woman sleeping under a *treated* net: 16% said there were no disadvantages; 19% said that they do not know of a disadvantage.
- The most commonly mentioned disadvantages of a pregnant woman sleeping under a treated net had to do with irritating or even dangerous effects of the chemical: “smell is bad” (20%); “chemical is dangerous” (17%); “might make the pregnant woman nauseated/vomit” (16%); “causes irritation/cough” (11%); and “chemical can kill fetus/cause miscarriage” (10%). Respondents from Kano were especially fearful of the insecticide killing the fetus and making the woman sick.
- Some people (6%) mistakenly thought that a treated net cannot be washed.

Table 23: Perceived disadvantages of sleeping under a mosquito net for pregnant woman
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural		Net Ownership	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	Net owners	Non-owners
BASE	999	200	200	199	200	200	80	319	300	300	399	600	120	879
Insecticide is not effective	2.5	3	0	3	6	0.5	3.8	1.6	3.3	2.3	2	2.8	1.7	2.6
Smell is bad	19.9	17	14	12.6	22.5	33.5	26.3	19.7	20	18.3	21.1	19.2	31.7	18.3
Causes irritation/cough	11.2	12.5	3.5	24.6	10	5.5	16.3	11.3	11.7	9.3	12.3	10.5	15	10.7
Causes other illness	9.9	7	7	15.6	13.5	6.5	7.5	8.8	10.7	11	8.5	10.8	7.5	10.2
Might make woman nauseated/vomit	16.0	27.5	4	21.1	19	8.5	42.5	12.9	13	15.3	18.8	14.2	15	16.2
Chemical is dangerous	16.6	14	24	10.1	16	19	13.8	21	16	13.3	19.5	14.7	17.5	16.5
Chemical can kill fetus/cause miscarriage	10.3	2.5	4.5	25.1	14	5.5	0	10.3	14.7	8.7	8.3	11.7	15.8	9.6
Treated net can't be washed	6.1	5.5	7	7	8.5	2.5	7.5	6.3	7.7	4	6.5	5.8	7.5	5.9
Treated net gets dirty	1.0	0.5	0	0.5	4	0	0	0.9	2	0.3	0.8	1.2	0.8	1
Other	2.2	0.5	0	0.5	0	10	0	4.1	0.7	2.3	3.3	1.5	2.5	2.2
None	16.1	19	30	1.5	19.5	10.5	12.5	14.7	19	15.7	14.3	17.3	12.5	16.6
Don't know	18.6	17	19.5	20.6	15.5	20.5	8.8	18.5	15.7	24.3	16.5	20	10.8	19.7

4.2 ACCESS TO MOSQUITO NETS

Improving access to nets is a primary objective of the NetMark partnership, as access is a pre-requisite for ownership. All respondents, whether a net-owner or not, were asked where the nearest place was where they could purchase a net. They were also asked what mode of transport they would take to get there, and how long it would take to get there.

- Nearly all respondents (92%) reported that an open air/structured market was the nearest place they could buy a mosquito net. Responses among urban and rural respondents were nearly identical.
- Four percent (4%) said that they did not know where a net could be purchased or that nets were unavailable.
- The majority of respondents (76%) reported they would take a bus to get to the nearest place where they could purchase a mosquito net, with more people in rural areas (82%) than urban areas (66%) having to take a bus. Those having to take a bus reported that it would take, on average, 56 minutes to get there, although the amount of time needed varied considerably (standard deviation 44 minutes), with rural dwellers having longer bus rides than urban residents.
- Overall, 17% of respondents said that they could travel by foot to the nearest place to purchase a net, but in urban Lagos, 46% indicated they could do so. Those within walking distance of a net source said they would require an average of 22 minutes to get there.

Table 24: Nearest place households can purchase mosquito nets
Among all households

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Not available	1.5	0.5	1	4	2	0	0	1.3	2.3	1.3	1	1.8
Open air/structured market	92.3	88	97	87.9	93	95.5	90	93.4	91.3	92.7	92.7	92
Local kiosk	0.3	0	0.5	1	0	0	0	0.3	0.7	0	0.3	0.3
Street/table top vendor	0.1	0	0	0	0.5	0	0	0	0.3	0	0	0.2
General/Indian Shop	0.1	0	0	0	0.5	0	0	0	0	0.3	0	0.2
Textile/clothes/bedding shop	0.4	0.5	0	0.5	1	0	1.3	0	0.7	0.3	0.3	0.5
Wholesaler	0.4	0	0	0.5	1.5	0	0	0.6	0.3	0.3	0.5	0.3
Pharmacy/chemist	0.3	1.5	0	0	0	0	2.5	0	0.3	0	0.5	0.2
Drug store	0	0	0	0	0	0	0	0	0	0	0	0
Supermarket	1.7	1.5	0.5	4.5	0	2	2.5	3.1	1	0.7	3	0.8
Mini-mart	0	0	0	0	0	0	0	0	0	0	0	0
Project (e.g. NGO)	0	0	0	0	0	0	0	0	0	0	0	0
Clinic/hospital	0.2	0	0	0.5	0	0.5	0	0.3	0	0.3	0.3	0.2
Don't know	2.7	8	1	1	1.5	2	3.8	0.9	3	4	1.5	3.5

Table 25: Mode of transport to nearest place where net purchase can be made
Among households that know of the nearest place where they can purchase a mosquito net

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	957	183	196	189	193	196	77	312	284	284	389	568
By foot	17.1	29.5	1.5	2.6	29.5	23	45.5	14.7	7.7	21.5	20.8	14.6
By bus	75.7	69.4	93.9	85.7	59.1	69.9	53.2	68.9	88	76.8	65.8	82.4
By car	6.3	0	4.6	11.6	11.4	3.6	0	14.1	3.9	1.8	11.3	2.8
Other	0.9	1.1	0	0	0	3.6	1.3	2.2	0.4	0	2.1	0.2

Table 26: Length of time it takes by foot to get to nearest place where net could be purchased
Among respondents who would travel by foot to get to nearest place

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	164	54	3	5	57	45	35	46	22	61	81	83
Mean no. of minutes	21.7	24.3	63.33	20.4	22.86	14.47	25.57	16.24	42.05	16.25	20.27	23.08
Standard Deviation	22.6	19.98	101.04	17.05	17.86	18.09	15.39	10.53	43.51	17.03	13.59	28.78
Median value	14	26	5	10	14.55	9.18	27.15	13.33	27.14	9.36	14.89	11.75

Table 27: Length of time it takes by bus to get to nearest place where net could be purchased
Among respondents who would travel by bus to get to nearest place

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	724	127	184	162	114	137	41	215	250	218	256	468
Mean no. of minutes	55.8	61.3	62.8	61	44.1	44.8	55.8	30.7	63.7	71.5	34.7	67.3
Standard Deviation	43.8	44.9	49.4	51.5	32.5	26.1	32.9	22.0	50.8	42.6	25.7	47.2
Median value	42.2	51.1	53.5	46	29.3	35.9	45.9	25.7	53.5	58.5	26.8	56.5

4.3 AFFORDABILITY OF MOSQUITO NETS

One of the objectives of NetMark is to make ITMs more affordable. Affordability of nets is being monitored in several ways, mostly via other NetMark-sponsored studies. “Willingness to pay” information was gathered as part of market research conducted by Research International; and data on price of nets is being monitored using periodic retail audits and manufacturers’ sales data.

This household survey contains two supplementary measures of affordability. On the assumption that actual price paid is a good indicator of affordability, respondents were asked how much they paid for each net owned. Data on price of nets is found in “Characteristics of Nets Owned” (Section 4.5). Respondents from households without nets were asked why they did not own any nets. “Cost/can’t afford” is one response category, serving as a measure of the extent to which respondents perceive nets to be too expensive. Data on this question are found at the end of the following section on “Mosquito net ownership.”

4.4 MOSQUITO NET OWNERSHIP

One of the main topics of interest is net ownership or “coverage” — both the extent of coverage and pattern of coverage in terms of characteristics such as household socio-economic status and location. Respondents were asked if their household owned any mosquito nets, and, if so, how many. “Net” refers to any type or shape of net except baby nets (small umbrella-type nets that only fit an infant). Respondents from households without nets were asked why they did not own a net.

Ownership patterns

- Twelve percent (12%) of households reported owning one or more mosquito nets. (This figure may be higher than the national average, given that one of the sample sites—Nsukka—has active net promotion projects. Note also from Table 35 that a fair proportion—35%—of these are single nets, some of which may have been initially purchased for a child who went to boarding school; and that some of the nets are “cot nets” that are crib-sized.)
- There was great variation by site in the proportion of households that owned mosquito nets, ranging from 2% in Ibadan site to 19% in Nsukka site.
- When comparisons were made among Lagos urban, other urban, near rural, and far rural areas, ownership was lowest in Lagos proper (8%) and in far rural areas (9%). Conversely, it was higher (15%) in urban areas other than Lagos, and in locales immediately surrounding those urban areas (13%).
- Twenty-five percent (25%) of net-owning households owned more than one net: 18% owned two mosquito nets and 6% owned three. The mean number of nets owned among all net-owning households was 1.33.
- Households in the highest SES segment (top 20%) were more likely than others to own a net.

Table 28: Household ownership of mosquito nets
Among all households

	Site					Location				Urban/Rural		Socio-Economic Status					
	Total	Lagos	Ibadan	Kano	Maidu- Nsukka guri	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5	
BASE	999	200	200	199	200	200	80	319	300	300	399	600	195	204	201	200	199
Yes	12	14	1.5	12.6	13.5	18.5	7.5	14.7	13.3	9	13.3	11.2	11.3	6.4	13.9	10	18.6
No	88	86	98.5	87.4	86.5	81.5	92.5	85.3	86.7	91	86.7	88.8	88.7	93.6	86.1	90	81.4

Table 29: Number of mosquito nets owned
Among households owning mosquito nets

	Site					Location				Urban/Rural		Socio-Economic Status					
	Total	Lagos	Ibadan	Kano	Maidu- Nsukka guri	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5	
BASE	120	28	3	25	27	37	6	47	40	27	53	67	22	13	28	20	37
1	75.0	78.6	66.7	96.0	63.0	67.6	100	68.1	80.0	74.1	71.7	77.6	54.5	69.2	85.7	55	91.9
2	18.3	21.4	33.3	4.0	18.5	24.3	0	21.3	15.0	22.2	18.9	17.9	40.9	23.1	10.7	20	8.1
3	5.8	0	0	0	14.8	8.1	0	10.6	2.5	3.7	9.4	3.0	4.5	7.7	3.6	20	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5+	0.8	0	0	0	3.7	0	0	0	2.5	0	0	1.5	0	0	0	5	0
Mean no. of nets	1.33	1.21	1.33	1.04	1.63	1.41	1	1.43	1.3	1.3	1.38	1.3	1.5	1.38	1.18	1.8	1.08
Std Dev	0.67	0.42	0.58	0.2	1.01	0.64	0	0.68	0.76	0.54	0.66	0.67	0.6	0.65	0.48	1.11	0.28

Reasons for non-ownership

- Over half (60%) of respondents from non-net owning households reported that a reason why they don’t own any mosquito nets is because they “don’t have any/enough money.” A much higher proportion of rural (70%) than urban (45%) respondents cited this reason. In addition, there is a direct linear relationship between citing “don’t have any/enough money” as a reason an non-ownership of nets: the higher the SES the less likely a household was to cite this as a reason.
- Overall, 22% said that they don’t like or don’t need nets, but respondents from Lagos urban were more likely than others to mention these reasons (39%).
- Overall, 12% said that nets are not available or they don’t know where to get them, but an especially high proportion of Ibadan site residents (23%) cited this as a reason for not having a net.

Table 30: Reasons why households do not own any mosquito nets
Among households that do not own mosquito nets (multiple responses possible)

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	879	172	197	174	173	163	74	272	260	273	346	533	173	191	173	180	162
Don't have any/enough money	59.8	47.1	60.4	57.5	48.0	87.7	36.5	47.1	68.5	70.7	44.8	69.6	85.5	72.3	60.1	43.3	35.8
Not available/don't know where to get them	11.9	13.4	22.8	3.4	16.8	1.2	16.2	17.3	12.7	4.8	17.1	8.6	2.3	6.8	14.5	25.6	10.5
Don't like them	9.2	11.0	4.6	18.4	12.1	0	12.2	11.8	8.1	7	11.8	7.5	2.3	7.3	11	8.9	17.3
Don't need them	13.0	27.3	5.6	10.9	17.9	3.7	27.0	13.6	10.0	11.4	16.5	10.7	5.2	6.8	9.2	18.9	26.5
Nets won't fit on sleeping space	3.6	5.8	1.0	5.7	4.6	1.2	8.1	4.0	3.1	2.6	4.9	2.8	1.7	3.1	3.5	2.2	8
Other	1.7	0	1.5	0	0.6	6.7	0	2.6	1.5	1.5	2.0	1.5	1.2	1.5	1.2	1.8	1.2
Don't know	4.9	0.6	5.1	13.8	2.9	1.8	1.4	8.1	3.1	4.4	6.6	3.8	2.9	5.8	4.6	5	6.2

4.5 CHARACTERISTICS OF NETS OWNED

Respondents in net-owning households were asked, for each net owned, where the net was obtained, when the net was acquired, and what brand, size, and shape and price it was. They were also asked how often, if at all, the net was washed, since effectiveness of the treatment diminishes with washing and frequency of washing will affect decisions about insecticide treatment formulations and decisions about educational messages.

Where nets were obtained

- The vast majority of nets owned by households were purchased in the open-air market (90%). There appear to be very few other commercial sources of nets, and no non-commercial sources of nets.
- Fifteen percent (15%) of nets (4/26) owned by households in Kano site were received as a gift.
- Only those in the highest SES segments purchased their nets from a formal commercial source (fixed store).

Table 31: Place where net was obtained
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Market	89.9	94.1	100	76.9	93	90.4	100	86.6	88.2	97.1	87.7	91.9
Kiosk	0.6	0	0	0	0	1.9	0	0	2	0	0	1.2
Street vendor	0	0	0	0	0	0	0	0	0	0	0	0
General shop	0	0	0	0	0	0	0	0	0	0	0	0
Textile shop	0	0	0	0	0	0	0	0	0	0	0	0
Wholesaler	0	0	0	0	0	0	0	0	0	0	0	0
Pharmacy	0	0	0	0	0	0	0	0	0	0	0	0
Drug store	0	0	0	0	0	0	0	0	0	0	0	0
Supermarket	1.9	2.9	0	7.7	0	0	0	1.5	2	2.9	1.4	2.3
Project	0	0	0	0	0	0	0	0	0	0	0	0
Clinic	0	0	0	0	0	0	0	0	0	0	0	0
School	0	0	0	0	0	0	0	0	0	0	0	0
Gift	5.0	2.9	0	15.4	7	0	0	6	7.8	0	5.5	4.7
Employer	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	2.5	0	0	0	0	7.7	0	6.0	0	0	5.5	0

Table 32: Type of source where net was obtained
Among total number of nets owned

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	159	34	4	26	43	52	6	67	51	35	73	86	33	18	33	35	40
Informal Commercial	90.6	94.1	100	76.9	93	92.3	100	86.6	90.2	97.1	87.7	93	100	83.3	93.9	91.4	82.5
Formal Commercial	1.9	2.9	0	7.7	0	0	0	1.5	2	2.9	1.4	2.3	0	0	0	2.9	5
Non-Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gift	5	2.9	0	15.4	7	0	0	6	7.8	0	5.5	4.7	0	5.6	3	2.9	12.5
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	2.5	0	0	0	0	7.7	0	6	0	0	5.5	0	0	11.1	3	2.9	0

Age of nets owned

- Twenty-eight percent (28%) of nets owned by households were acquired within the past 2 years, and 21% were acquired 5 or more years ago.
- Households in the Maiduguri site tended to have newer nets than did households in other sites: 39% of nets in and around Maiduguri had been acquired within the prior two years. Nets in urban households tended to be newer than nets in rural households: 32% of urban and 24% of rural nets had been acquired in the past two years. Thirty-one percent (31%) of nets in households in far rural areas had been obtained five or more years ago.

Table 33: Number of years households have owned their nets
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
0-<1 years	9.4	20.6	0	3.8	4.7	9.6	33.3	7.5	9.8	8.6	9.6	9.3
1-<2 years	18.2	8.8	0	23.1	34.9	9.6	0	23.9	11.8	20	21.9	15.1
2-<3 years	25.2	26.5	25	15.4	27.9	26.9	16.7	23.9	31.4	20	23.3	26.7
3-<4 years	19.5	20.6	50	15.4	20.9	17.3	50	17.9	21.6	14.3	20.5	18.6
4-<5 years	4.4	8.8	0	7.7	2.3	1.9	0	1.5	7.8	5.7	1.4	7
5+ years	21.4	14.7	25	26.9	9.3	32.7	0	22.4	15.7	31.4	20.5	22.1
Don't know	1.9	0	0	7.7	0	1.9	0	3	2	0	2.7	1.2

Brand of nets owned

- Thirty-eight percent (38%) of nets owned by households were reportedly tailor-made (non-manufactured) nets, which are not branded. Tailor-made nets were more common in the rural than urban areas, with nearly half (46%) of the nets in the rural areas being tailor made compared with about one-fourth (27%) in the urban areas.
- It was difficult to obtain information on brands of nets. Most consumers who owned commercial (non tailor-made) nets did not know the brand, and a minority of others gave non-existent or unlikely brands.

Table 34: Net brands owned
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
PowerNET	2.5	0	25	0	7	0	0	1.5	5.9	0	1.4	3.5
RAID	11.3	0	0	46.2	14	0	0	17.9	9.8	2.9	16.4	7
Tailor-made (non-manufactured)	37.7	88.2	75	46.2	34.9	0	50	25.4	49	42.9	27.4	46.5
Other	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	48.4	11.8	0	7.7	44.2	100	50	55.2	35.3	54.3	54.8	43

Size and shape of nets owned

- The most common net sizes owned were single (35%) and double nets (31%). Sixteen percent (16%) of nets were king-size and 16% cot-size nets. Cot-size nets were more common in the urban (22%) than in the rural (12%) areas whereas double-size nets were more common in the rural (41%) than in the urban (21%) areas.
- The great majority (93%) of nets owned were rectangular in shape.

Table 35: Size of nets owned

Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Cot net	16.4	17.6	25	30.8	4.7	17.3	33.3	20.9	5.9	20	21.9	11.6
Single	34.6	8.8	50	30.8	48.8	40.4	0	41.8	39.2	20	38.4	31.4
Double	31.4	44.1	25	15.4	25.6	36.5	50	17.9	45.1	34.3	20.5	40.7
King	15.7	29.4	0	23.1	16.3	3.8	16.7	14.9	9.8	25.7	15.1	16.3
Don't know	1.9	0	0	0	4.7	1.9	0	4.5	0	0	4.1	0

Table 36: Shape of nets owned

Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Rectangular	92.5	94.1	100	65.4	97.7	100	83.3	92.5	92.2	94.3	91.8	93
Round/conical	3.8	2.9	0	19.2	0	0	16.7	3	5.9	0	4.1	3.5
Triangle/pyramid	1.9	0	0	7.7	2.3	0	0	4.5	0	0	4.1	0
Wedge	1.3	0	0	7.7	0	0	0	0	2	2.9	0	2.3
Don't know/ can't recall	0.6	2.9	0	0	0	0	0	0	0	2.9	0	1.2

Cost of nets owned

- Respondents were asked what the cost of each net owned was. The figures obtained give a general idea of price, but it should be noted that because of potential problems with recall for older nets, and because of currency devaluations over time, these figures should be taken as very general estimates.
- Households reported paying an average of 531 Naira (4.92 USD) per net (conversion based on the exchange rate for the dollar on the date of the data collection). Respondents did not know the cost for a high percentage (35%) of their nets.

Table 37: Average cost of (all) nets (Naira)

Nets in Households

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	159	34	4	26	43	52	6	67	51	35	73	86	33	18	33	35	40
Average price	531	599	300	655	384	525	315	654	495	436	635	467	432	399	623	427	708
Standard Deviation	554	292.0	70.7	424.0	144.3	860.8	49.5	849.5	213.2	304.8	828.7	260.8	193.1	284.1	1021.4	175.1	447.8
Trade/Barter (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Free (%)	5.7	5.9	0	11.5	9.3	0	0	6	7.8	2.9	5.5	5.8	0	5.6	6.1	0	15
Don't know (%)	35.2	32.4	50	15.4	41.9	40.4	66.7	43.3	33.3	17.1	45.2	26.7	24.2	27.8	30.3	57.1	32.5

Table 38: Average cost of (all) nets (USD)
Nets in Households

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	159	34	4	26	43	52	6	67	51	35	73	86	33	18	33	35	40
Average price	4.92	5.55	2.78	6.07	3.55	4.86	2.91	6.06	4.58	4.04	5.88	4.32	4	3.69	5.77	3.95	6.56
Standard Deviation	5.13	2.7	0.66	3.93	1.34	7.97	0.46	7.87	1.97	2.82	7.67	2.42	1.79	2.63	9.46	1.62	4.15
Trade/Barter (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Free (%)	5.7	5.9	0	11.5	9.3	0	0	6	7.8	2.9	5.5	5.8	0	5.6	6.1	0	15
Don't know (%)	35.2	32.4	50	15.4	41.9	40.4	66.7	43.3	33.3	17.1	45.2	26.7	24.2	27.8	30.3	57.1	32.5

Net washing patterns

- The vast majority (91%) of nets had been washed at least once.
- Over three-quarters (77%) of nets that had been washed were reportedly washed once a month or more often, with about one-third (32%) reportedly washed weekly.

Table 39: Net ever washed
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Yes	91.2	91.2	100	65.4	97.7	98.1	100	92.5	88.2	91.4	93.2	89.5
No	8.8	8.8	0	34.6	2.3	1.9	0	7.5	11.8	8.6	6.8	10.5

Table 40: Net washing frequency
Among nets that had been washed

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	145	31	4	17	42	51	6	62	45	32	68	77
About once a year	4.8	0	0	17.6	2.4	5.9	0	6.5	4.4	3.1	5.9	3.9
About every six months	4.8	6.5	0	5.9	2.4	5.9	0	3.2	11.1	0	2.9	6.5
About every three months	12.4	16.1	0	5.9	9.5	15.7	50.0	16.1	4.4	9.4	19.1	6.5
About once a month	23.4	12.9	75.0	17.6	33.3	19.6	16.7	21	24.4	28.1	20.6	26.0
About every two weeks	20.7	29.0	25.0	11.8	26.2	13.7	16.7	11.3	26.7	31.3	11.8	28.6
About once a week	32.4	35.5	0	35.3	26.2	37.3	16.7	40.3	28.9	25.0	38.2	27.3
Other	0.7	0	0	0	0	2	0	0	0	3.1	0	1.3
Don't know	0.7	0	0	5.9	0	0	0	1.6	0	0	1.5	0

4.6 MOSQUITO NET TREATMENT

Nets that are treated with an insecticide are much more effective against mosquito bites (and therefore malaria) than untreated nets. The insecticide kills and repels mosquitoes and other insects, even if the net is torn or is not completely tucked in. An ITN also affords some protection for others sleeping in the same room, even if they are not sleeping under the net. Nets that are “pretreated” (i.e., already have insecticide on them when purchased) are beginning to be available in some areas, but even these nets need to be treated/re-treated (“post-treated”) regularly to remain effective.

In one section of the survey, all respondents were asked if they had heard of treating nets with an insecticide. Later, respondents living in net-owning households were asked whether their nets had ever been treated. For each net treated, respondents were asked how many months it has been since the last treatment, total number of post-treatments, product used to treat the nets, place where it was obtained, and how much it cost. (Note that since no

nets in this sample had been treated, these treatment questions were not asked and data tables for these questions are not provided as they are for other countries.)

- Few respondents (7%) had ever heard of treating mosquito nets with an insecticide.
- Awareness of ITNs was highest in Maiduguri site (14%) and lowest in Ibadan site (2%). Awareness was higher in the urban (11%) than in the rural (5%) areas. Those in the higher SES categories were more aware of net treatment than those in lower SES categories.
- There is virtually no treatment of nets in Nigeria. Only one household (from Kano site) reported owning a treated net. This net was already treated when purchased.

Table 41: Awareness of insecticide treated mosquito nets
Among all respondents

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	999	200	200	199	200	200	80	319	300	300	399	600	195	204	201	200	199
Yes	7.3	5.5	2	8	14	7	8.8	11.6	5.7	4	11	4.8	5.6	3.4	5.5	9	13.1
No	92.7	94.5	98	92	86	93	91.3	88.4	94.3	96	89	95.2	94.4	96.6	94.5	91	86.9

Table 42: Household ownership of treated (pre and/or post) mosquito nets
Among all households

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
BASE	999	200	200	199	200	200	80	319	300	300	399	600	195	204	201	200	199
Yes	0.1	0	0	0.5	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.5
No	99.9	100	100	99.5	100	100	100	99.7	100	100	99.7	100	100	100	100	100	99.5

Table 43: Nets ever treated (pre and/or post)
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Yes	0.6	0	0	3.8	0	0	0	1.5	0	0	1.4	0
No	99.4	100	100	96.2	100	100	100	98.5	100	100	98.6	100

Table 44: Ownership of pretreated mosquito nets
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Yes	0.6	0	0	3.8	0	0	0	1.5	0	0	1.4	0
No	93.7	100	100	96.2	79.1	100	100	85.1	100	100	86.3	100
Don't know	5.7	0	0	0	20.9	0	0	13.4	0	0	12.3	0

Table 45: Ownership of post-treated mosquito nets
Among total number of nets owned

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	159	34	4	26	43	52	6	67	51	35	73	86
Yes	0	0	0	0	0	0	0	0	0	0	0	0
No	99.4	100	100	96.2	100	100	100	98.5	100	100	98.6	100
Don't know	0.6	0	0	3.8	0	0	0	1.5	0	0	1.4	0

4.7 APPROPRIATE USE

Although it is beneficial for any household member to sleep under a net, it is particularly important for those vulnerable to serious cases of malaria—children under five and pregnant women—to do so. This section reports on “appropriate use” of nets by looking at various measures of use by households, children under five, women of reproductive age, and pregnant women. Some of the measures use the household as the denominator (unit of analysis), while others use number of individuals in the vulnerable group as the denominator. Measures have been calculated to indicate use of any net, and then, specifically, use of a treated net.

The sample was limited to women of reproductive age (WRA)—age 15 to 49—so that net use by WRA could be calculated in addition to net use by pregnant women. The greatest public health impact for women and neonates is achieved when treated nets are used from the beginning of the pregnancy; however, many women do not realize they are pregnant, or do not wish to make their pregnancy public, for several months or more. Therefore, it is advisable for all women of reproductive age to sleep under treated nets nightly.

Overall household use

There were a total of 4804 people in all households and 588 people in net-owning households sampled.

- Among the 588 people in net-owning households, 45% had slept under a net the prior night. This represents 6% of all people living in the households sampled. .
- Children under five were most likely to sleep under a net; adult males were the least likely to sleep under a net. It was difficult drawing conclusions about pregnant women since the denominators were so small.
- A higher proportion of adult females (47%) in net-owning households slept under nets than adult males (22%).
- Practically no (0.2%) people in net-owning households had slept under a *treated* net the prior night, representing 0% of all people living in the households sampled. (Recall that only one net in the sample had been treated.)

Use by children under age five

There were 1,402 children under age five in all households and 169 children under age five in net-owning households. (Note that in order to be included in the sample, a child aged 0-4 had to reside in the household.)

- Among the 169 children under five in net-owning households, 73% had slept under a net the prior night. This represents 9% of all children under five in the households sampled.*
- The age of the child did not affect whether the child was placed under a net. The proportion of older children under age five sleeping under a net did not differ significantly from the proportion of younger children under age five. Between 64% and 80% of children at each age group slept under a net the prior night.
- The proportion of net-owning households where all children under five slept under a net the prior night decreased the more children the household had. For example, in only 27% of net-owning households with three or more children, all children slept under a net the prior night, whereas in 81% of net-owning households with one child, that child slept under a net the night prior.
- Only one household reported owning a *treated* net, and one child under five in that household did sleep under the *treated* net the night prior to the interview.

* This study investigated use of hanging bed nets only — not baby nets. Baby nets are umbrella-like nets that can be placed over an infant. It is possible that some infants had slept under a baby net.

Use by women of reproductive age and pregnant women

All households had at least one woman of reproductive age, since a criterion for selection was to be a WRA responsible for a child under five. The total number of women of reproductive age in the households sampled was 1,140. The number of WRA among net-owning households was 139. The number of pregnant women in the households sampled was 95 and, of these, 12 were from net-owning households.

- Forty-seven (47%) of WRA in net-owning households had slept under a net the prior night. This represents 6% of all WRA in the households sampled.
- Seven of the 12 pregnant women in net-owning households (58%) slept under a mosquito net the night prior to the interview. This represents 7% of all pregnant women living in the households sampled. (However, note the small denominators used to calculate percentages for pregnant women.)
- WRA and pregnant women in lower SES segments were more likely than their higher SES counterparts to sleep under a net.
- Only one household reported owning a *treated* net. No WRA slept under a treated net the night before the interview. Therefore, the proportion of WRAs and pregnant women sleeping under a treated net was 0.

General patterns

- A portion of nets had not been used the prior night: 9% of single nets, 6% of double nets, and 8% of king-size nets.
- Among nets that had been used, the average number of people sleeping under them was 2.39, king; 2.11, double; 1.6, single.
- The average number of months that people in the household slept under mosquito nets was 7.58.

Table 46: Proportions of household members who slept under a net last night
Among household members

	Household members in net-owning households			Household members in all households		
	Base	% sleeping under any net (n)	% sleeping under treated net (n)	Base	% sleeping under any net (n)	% sleeping under treated net (n)
All	588	44.7% (263)	0.2% (1)	4804	5.5% (263)	0% (1)
Adults (age 15+)						
Males	140	21.1% (31)	0% (0)	1091	2.8% (31)	0% (0)
Females	139	46.8% (65)	0% (0)	1147	5.7% (65)	0% (0)
Females ages 15-49	139	46.8% (65)	0% (0)	1140	5.7% (65)	0% (0)
Pregnant women	12	58.3% (7)	0% (0)	95	7.4% (7)	0% (0)
Older children (ages 5-14)						
Males	75	31.5% (23)	0% (0)	597	3.9% (23)	0% (0)
Females	65	30.8% (20)	0% (0)	567	3.5% (20)	0% (0)
Younger children (ages 0-4)						
All	169	73.4% (124)	0.6% (1)	1402	8.8% (124)	0.1% (1)
Males	90	74.4% (67)	1.1% (1)	680	9.9% (67)	0.1% (1)
Females	79	72.2% (57)	0% (0)	722	7.9% (57)	0% (0)
Age 0 - <1	19	73.7% (14)	0% (0)	112	12.5% (14)	0% (0)
Age 1 - <2	25	80.0% (20)	4% (1)	237	8.4% (20)	0.4% (1)
Age 2 - <3	40	70% (28)	0% (0)	294	9.5% (28)	0% (0)
Age 3 - <4	39	64.1% (25)	0% (0)	345	7.2% (25)	0% (0)
Age 4 - <5	46	80.4% (37)	0% (0)	414	8.9% (37)	0% (0)

Table 47: Proportions of vulnerable groups who slept under a net last night
Among persons most vulnerable to severe malaria in net-owning households

	Total	Site					Location				Urban/Rural		Socio-Economic Status				
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural	1	2	3	4	5
Children (0-4)																	
Any net (n=124)	73.4	84.6	66.7	68.6	85.0	59.6	66.7	74.6	66.7	83.8	73.6	73.2	66.7	73.7	76.3	75	73.6
Treated net (n=1)	0.6	0	0	2.9	0	0	0	1.6	0	0	1.4	0	0	0	0	0	1.9
Females (15-49)																	
Any net (n=65)	46.8	63.3	66.7	10	38.2	66.7	42.9	34.5	48.8	67.7	35.4	56.8	84	60	48.5	36	24.4
Treated net (n=0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pregnant Women																	
Any net (n=7)	58.3	100	50	0	0	66.7	0	60	50	100	60	57.1	100	100	75	0	0
Treated net (n=0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 48: Proportion of net-owning households in which none, some, or all children under five slept under a net last night
Among net-owning households with children under age five

	% Sleeping under any net			% Sleeping under treated net		
	None	Some	All	None	Some	All
Number of net-owning households with 1, 2 or 3+ children under age 5						
1 (n=67)	19.4	---	80.6	100	---	0
2 (n=42)	11.9	40.5	47.6	97.6	2.4	0
3+ (n=11)	9.1	63.6	27.3	100	0	0

Table 49: Mean number of people sleeping under a net, by net size
Among household members sleeping under specific size nets

	Size of net		
	King	Double	Single
BASE	25	50	55
None (%)	8.0	6.0	9.1
Mean (excluding zero)	2.39	2.11	1.60
Standard deviation	0.94	0.81	0.70
Median value	1.83	1.54	1.50

Table 50: Number of months per year people in household sleep under a net
Among net-owning households

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	120	28	3	25	27	37	6	47	40	27	53	67
Mean no. of months	7.58	8.32	9.67	8.6	6.3	7.11	6.17	7.85	7.18	8.04	7.66	7.52
Standard Deviation	3.54	3.59	4.04	3.39	3.3	3.53	3.76	3.78	3.4	3.33	3.78	3.38

4.8 CONSUMER MOSQUITO NET PREFERENCES

The prior section described the characteristics of nets owned, which is to a large extent a reflection of types of nets currently available. This section reports on the characteristics of nets that consumers *prefer*. Questions on net preferences were asked of all respondents, whether or not the household owned a net. The information in this section is useful for developing nets with features that consumers want.

Net shape and size preferences

- Over half (59%) of the respondents preferred rectangular shaped nets. About one-fourth (24%) preferred round/conical nets. Fewer households preferred triangle/pyramid (9%) or wedge (8%) shaped nets.
- Consumers preferred large nets. Over half of the households (56%) preferred king-size nets for their households and 22% preferred double-size nets. Only 14% preferred single-size nets and 8% cot-size nets.

Table 51: Net shape preferences
Among all respondents

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Rectangular	59	66	48.5	50.3	57	73	61.3	55.8	57.3	63.3	56.9	60.3
Round/conical	23.5	15.5	32	24.6	24	21.5	21.3	26.6	24.7	19.7	25.6	22.2
Triangle/pyramid	9.0	10.0	8.0	13.1	11.5	2.5	7.5	8.2	11.3	8.0	8.0	9.7
Wedge	7.8	8.5	10.5	11.1	6.5	2.5	10.0	8.2	6.7	8.0	8.5	7.3
Other	0.5	0	1	1	0	0.5	0	0.6	0	1	0.5	0.5
No preference	0.2	0	0	0	1	0	0	0.6	0	0	0.5	0

Table 52: Net size preferences
Among all respondents

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Cot-net	8.2	2.5	9	9.5	11.5	8.5	3.8	10.3	9.3	6	9	7.7
Single	14	5	18	16.6	23	7.5	2.5	18.2	13.7	13	15	13.3
Double	21.8	22.5	17	22.1	26	21.5	28.8	18.8	24.3	20.7	20.8	22.5
King	55.8	70	55.5	51.8	39.5	62	65	52.7	52.7	59.7	55.1	56.2
Other	0.2	0	0.5	0	0	0.5	0	0	0	0.7	0	0.3
No preference	0.1	0	0.5	0	0	0	0	0	0	0.3	0	0.2

Net color preferences

- Light-colored mosquito nets were preferred by the majority of respondents. White nets were preferred by 34% of respondents; pink by 22%; light blue by 15%; and light green by 12%.
- Over half (52%) of the respondents reported disliking black nets (52%). Fourteen percent (14%) disliked dark green, 10% disliked dark blue nets, and 9% white nets.

Table 53: Net color preferences
Among all respondents

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
White	34.1	32	27	37.2	40.5	34	25	35.1	30.7	39	33.1	34.8
Light blue	15.4	22.5	18.5	13.6	8.5	14	31.3	13.5	16.3	12.3	17	14.3
Dark blue	9.2	4	7.5	11.1	12.5	11	3.8	9.4	11.3	8.3	8.3	9.8
Light green	12.7	11	16.5	10.6	13	12.5	10	14.4	13.3	11	13.5	12.2
Dark green	3.6	1.5	2	3.5	4.5	6.5	2.5	5.3	3.7	2	4.8	2.8
Pink	22.1	27	26.5	21.6	17.5	18	26.3	19.4	22	24	20.8	23
Black	2.4	2	1	2.5	3	3.5	1.3	2.5	2.3	2.7	2.3	2.5
No preference/don't know	0.4	0	1	0	0.5	0.5	0	0.3	0.3	0.7	0.3	0.5

Table 54: Net color dislikes
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
White	9	4	6.5	9.5	7.5	17.5	5	9.7	9.7	8.7	8.8	9.2
Light blue	3.7	0.5	2.5	6	8	1.5	0	3.1	6.7	2.3	2.5	4.5
Dark blue	9.6	6	10.5	7.5	11.5	12.5	3.8	13.5	8	8.7	11.5	8.3
Light green	4.9	3.5	2	6	7.5	5.5	6.3	5.6	5.3	3.3	5.8	4.3
Dark green	14.1	13	20	9.5	14	14	13.8	10.7	18.7	13.3	11.3	16
Pink	6.2	5.5	4	8	5.5	8	6.3	6.6	7	5	6.5	6
Black	52.2	54.5	71	55.3	37.5	42.5	58.8	53.3	48.3	53	54.4	50.7
None/don't know	14.9	13.5	9	17.1	17	18	7.5	15.4	13.3	18	13.8	15.7

SECTION 5 OTHER MOSQUITO CONTROL PRODUCTS

In order to understand the role of nets in the larger context of mosquito control products, respondents were asked what mosquito control methods they knew of and used, what attributes of mosquito control they valued the most, and what products and brands they associated with various attributes. This information will be particularly useful for the private sector as it seeks to meet consumer needs.

5.1 AWARENESS OF MOSQUITO CONTROL PRODUCTS AND METHODS

- The commercial insect control products respondents were most aware of (unprompted mention) were aerosols (80%), mosquito coils (78%), window/door screens (30%), and mosquito nets (25%). (Note that this does not mean that 75% had not heard of nets, but that 75% did not place nets in the category of mosquito control products. The same may be true for window screens.) Few (8%) were aware of repellants.
- Mention of mosquito nets was highest in Maiduguri (61%) and lowest in Ibadan site (5%).
- A minority of respondents mentioned non-commercial methods of mosquito control: 12% mentioned burning things such as leaves or fruit peels and 18% mentioned keeping surroundings clean. (Note that keeping surroundings clean will not reduce malaria, since the anopheles mosquito which carries the malaria parasite breeds only in clean water. This may, however, affect other mosquito populations.)

Table 55: Awareness of mosquito control products and methods
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu- guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
COMMERCIAL PRODUCTS												
Sleep under a mosquito net (untreated or unspecified)	24.5	8	4.5	5	61	44	1.3	28.8	29.3	21.3	23.3	25.3
Sleep under an insecticide-treated mosquito net	0.2	0.5	0	0	0	0.5	1.3	0	0	0.3	0.3	0.2
Use mosquito coils	77.9	74	85.5	78.9	98.5	52.5	61.3	70.2	80.3	88	68.4	84.2
Use aerosol insecticide	79.8	73	87	65.3	99	74.5	85	86.5	74.3	76.7	86.2	75.5
Use commercial mosquito repellent on body	7.7	2.5	2	13.1	19.5	1.5	5	12.9	7.7	3	11.3	5.3
Use flit gun/spray gun (that you fill yourself)	4.7	9	0.5	3	10	1	12.5	4.1	3.7	4.3	5.8	4
Have screens on windows/doors	29.8	36	44.5	27.1	34	7.5	40	35.1	25	26.3	36.1	25.7
Other commercial method	7.2	12.5	0.5	1.5	8.5	13	11.3	6.9	8	5.7	7.8	6.8
NON-COMMERCIAL METHODS												
Close windows and doors	11	16	10.5	8.5	5.5	14.5	21.3	9.1	11	10.3	11.5	10.7
Burn things	11.7	6.5	16	10.6	15.5	10	6.3	8.5	10.7	17.7	8	14.2
Keep surroundings clean	18.2	17.5	26.5	17.6	15	14.5	17.5	16.6	17	21.3	16.8	19.2
Other non-commercial method	4.8	2	14	0	1	7	3.8	4.1	5.7	5	4	5.3

5.2 USE OF COMMERCIAL MOSQUITO CONTROL PRODUCTS

If a respondent was aware of a given mosquito control method, she was asked whether she had used that method in the prior year. Note that these figures may be lower than actual use, given that “use” was asked only of those who indicated that they were aware of a given product, and level of use was calculated using total number of respondents as the base. Note also that use of nets is covered in Section 4.

- The commercial mosquito control products respondents most often reported that their households used in the last 12 months were mosquito coils (62%) and aerosol insecticides (54%).

- A higher percentage of respondents in the rural areas (71%) reported using coils than in the urban areas (50%); whereas a higher percentage of respondents in the urban areas (71%) reported using aerosols than in the rural areas (42%).

Table 56: Use of commercial mosquito control products
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Use mosquito coils	62.3	49	70	75.9	79	37.5	31.3	53.9	65.7	76	49.4	70.8
Use aerosol insecticide	53.8	56	66	57.8	43.5	45.5	80	68.7	50	34.7	70.9	42.3
Use commercial mosquito repellent on body	3.4	1.5	1	10.1	3.5	1	3.8	6.6	2	1.3	6	1.7
Use flit gun/spray gun (that you fill yourself)	2.2	6.5	0	2.5	1.5	0.5	6.3	1.3	2.3	2	2.3	2.2
Have mosquito screens/nets in windows/doors	15	24.5	25.5	18.6	2.5	4	31.3	19.4	8.7	12.3	21.8	10.5
Other commercial method	6.4	9.5	0.5	1.5	8	12.5	10	6.6	7.3	4.3	7.3	5.8

5.3 FREQUENCY, LOCATION, AND PRICE OF COIL, AEROSOL, AND REPELLANT PURCHASES

Coils

- Households buy mosquito coils very frequently. Coils can be sold in packs or individually. Of the 62% of households that had purchased mosquito coils in the last 12 months, almost half (47%) reported that they bought them “today or yesterday” and 27% reported that they bought them in the last week. Frequency of purchase was fairly equal between urban and rural areas.
- Consumers tend to buy coils from informal vendors: almost half (49%) of the households that purchased coils purchased them at a kiosk; one-quarter (25%) purchased their coils in a market; and 14% purchased them from a street vendor. No significant differences were seen between urban and rural households regarding where coils were purchased.
- The average reported price paid for a single mosquito coil was 0.06 USD.

Table 57: Frequency of mosquito coil purchase
Among households that used mosquito coils in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	622	98	140	151	158	75	25	172	197	228	197	425
Today or yesterday	46.5	36.7	30.7	58.3	70.9	13.3	40	43	45.2	50.9	42.6	48.2
Within the last 7 days	26.5	38.8	24.3	31.1	20.9	17.3	44	22.1	28.9	25.9	24.9	27.3
Within the last month	11.1	13.3	17.9	6	5.7	17.3	4	12.2	9.6	12.3	11.2	11.1
Within the last 3 months	4.8	3.1	8.6	2.6	0.6	13.3	0	8.7	3.6	3.5	7.6	3.5
More than 3 months ago	8.4	3.1	17.9	0.7	1.3	28	8	11	8.6	6.1	10.7	7.3
Don't know	2.7	5.1	0.7	1.3	0.6	10.7	4	2.9	4.1	1.3	3	2.6

Table 58: Average price of single mosquito coil (USD)
Among households that bought a single mosquito coil

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	435	72	108	102	117	36	19	115	144	157	134	301
Average price	0.06	0.05	0.05	0.05	0.06	0.11	0.05	0.06	0.05	0.06	0.06	0.06
Standard deviation	0.06	0.01	0.04	0.01	0.07	0.13	0.01	0.07	0.01	0.07	0.06	0.05
Don't know (%)	1.8	0	0.9	1	0	16.7	0	1.7	2.1	1.9	1.5	2

Table 59: Place where mosquito coils were purchased
Among households that used mosquito coils in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	622	98	140	151	158	75	25	172	197	228	197	425
Market	24.9	23.5	11.4	28.5	12	72	12	22.7	18.8	33.3	21.3	26.6
Kiosk	49.2	23.5	49.3	65.6	65.2	16	36	52.9	53.8	43.9	50.8	48.5
Street vendor	14.3	14.3	37.1	2.6	10.8	2.7	20	14	15.7	12.7	14.7	14.1
General shop	2.1	8.2	0	1.3	0.6	2.7	8	2.3	1.5	1.8	3	1.6
Wholesaler	0.3	0	0	1.3	0	0	0	1.2	0	0	1	0
Pharmacy	1	5.1	0.7	0	0	0	4	0	1.5	0.9	0.5	1.2
Drugstore	0.2	1	0	0	0	0	0	0	0	0.4	0	0.2
Supermarket	0	0	0	0	0	0	0	0	0	0	0	0
Mini-mart	6.4	20.4	0	0	11.4	2.7	20	4.1	6.1	7	6.1	6.6
Other	0.3	0	1.4	0	0	0	0	1.2	0	0	1	0
Don't know	1.3	4.1	0	0.7	0	4	0	1.7	2.5	0	1.5	1.2

Aerosols

- Of the 54% of households that had purchased aerosols in the last 12 months, 62% had purchased them within the past month. Frequency of purchase was fairly equal between urban and rural areas.
- Half (50%) of the households that had purchased aerosols purchased them in a market; 15% in a pharmacy; 13% at a kiosk; and 10% in a supermarket. Purchase of aerosols from a kiosk was higher among rural (18%) than urban (8%) households. Conversely, purchase of aerosols from a supermarket was much higher among urban (16%) than rural (3%) households.
- Households in Lagos site purchased their aerosols from pharmacies (46%) more than from any other trader.
- The average reported price paid for a 300-350 ml can of aerosol insecticide was 1.35 USD.

Table 60: Frequency of aerosol insecticide purchase
Among households that used aerosol insecticides in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	537	112	132	115	87	91	64	219	150	104	283	254
Today or yesterday	8.4	3.6	2.3	21.7	12.6	2.2	1.6	10	5.3	13.5	8.1	8.7
Within the last 7 days	21.4	25	17.4	33.9	24.1	4.4	34.4	21	18.7	18.3	24	18.5
Within the last month	32.4	40.2	28	29.6	33.3	31.9	43.8	32.9	30	27.9	35.3	29.1
Within the last 3 months	14.2	13.4	15.9	7.8	14.9	19.8	10.9	11.9	18	15.4	11.7	16.9
More than 3 months ago	19.2	17.9	35.6	3.5	10.3	25.3	9.4	18.3	23.3	21.2	16.3	22.4
Don't know	4.5	0	0.8	3.5	4.6	16.5	0	5.9	4.7	3.8	4.6	4.3

Table 61: Average price of 300-350 ml can of aerosol insecticide (USD)
Among households that bought a 300-350 ml can of aerosol insecticide

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	492	109	117	106	76	84	61	198	134	99	259	233
Average price	1.35	1.35	1.45	1.29	1.34	1.22	1.4	1.34	1.35	1.3	1.36	1.33
Standard deviation	0.32	0.25	0.44	0.29	0.22	0.22	0.23	0.36	0.31	0.3	0.33	0.31
Don't know (%)	8.9	3.7	1.7	9.4	3.9	29.8	0	9.1	9	14.1	6.9	11.2

Table 62: Place where aerosol insecticides were purchased

Among households that used aerosol insecticides in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	537	112	132	115	87	91	64	219	150	104	283	254
Market	49.9	32.1	53.8	55.7	41.4	67	25	53.4	46.7	62.5	47	53.1
Kiosk	12.7	0.9	7.6	23.5	32.2	2.2	1.6	10	22	11.5	8.1	17.7
Street vendor	1.5	0.9	3.8	1.7	0	0	0	0.9	1.3	3.8	0.7	2.4
General shop	2.2	0.9	0	0	2.3	9.9	0	3.7	1.3	1.9	2.8	1.6
Wholesaler	0.9	0	0	2.6	1.1	1.1	0	1.4	0	1.9	1.1	0.8
Pharmacy	15.1	45.5	14.4	5.2	2.3	3.3	53.1	6.8	16	7.7	17.3	12.6
Drugstore	1.9	2.7	0.8	0	4.6	2.2	3.1	2.7	1.3	0	2.8	0.8
Supermarket	9.7	7.1	19.7	11.3	5.7	0	7.8	17.8	3.3	2.9	15.5	3.1
Mini-mart	3	8	0	0	8	0	9.4	0.5	4.7	1.9	2.5	3.5
Other	0.4	0	0	0	0	2.2	0	0.5	0	1	0.4	0.4
Don't know	2.8	1.8	0	0	2.3	12.1	0	2.3	3.3	4.8	1.8	3.9

Repellants

- Only 3% of households (almost all in Kano site) had purchased repellants in the last 12 months; among them, 62% had purchased a repellant in past month.
- Markets and kiosks were the most frequent source for repellants: about one-third (35%) of households that bought repellants in the last 12 months did so in a market; and approximately one-quarter (24%) bought at a kiosk.
- Too few respondents purchased repellants and recalled their price to enable tabulation of reliable price data for this product.

Table 63: Frequency of insect repellant purchase

Among households that used insect repellants in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	34	3	2	20	7	2	3	21	6	4	24	10
Today or yesterday	8.8	0	0	15	0	0	0	4.8	33.3	0	4.2	20
Within the last 7 days	11.8	0	50	15	0	0	0	19	0	0	16.7	0
Within the last month	41.2	0	0	50	57.1	0	0	42.9	50	50	37.5	50
Within the last 3 months	14.7	0	0	20	14.3	0	0	19	0	25	16.7	10
More than 3 months ago	17.6	100	0	0	28.6	50	100	4.8	16.7	25	16.7	20
Don't know	5.9	0	50	0	0	50	0	9.5	0	0	8.3	0

Table 64: Place of insect repellant purchase

Among households that used insect repellants in the 12 months before the interview

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	34	3	2	20	7	2	3	21	6	4	24	10
Market	35.3	0	0	45	28.6	50	0	33.3	33.3	75	29.2	50
Kiosk	23.5	0	0	30	28.6	0	0	19	66.7	0	16.7	40
Street vendor	0	0	0	0	0	0	0	0	0	0	0	0
General shop	0	0	0	0	0	0	0	0	0	0	0	0
Wholesaler	0	0	0	0	0	0	0	0	0	0	0	0
Pharmacy	14.7	100	0	5	0	50	100	4.8	0	25	16.7	10
Drugstore	8.8	0	50	0	28.6	0	0	14.3	0	0	12.5	0
Supermarket	14.7	0	50	20	0	0	0	23.8	0	0	20.8	0
Mini-mart	2.9	0	0	0	14.3	0	0	4.8	0	0	4.2	0

5.4 PERCEPTIONS OF MOSQUITO CONTROL ATTRIBUTES, PRODUCTS, AND BRANDS

Valued attributes of mosquito control products

Respondents were read a list of attributes of mosquito control products and were asked to rate, on a scale of 1-7, how important to them various attributes were.

- All attributes named were considered fairly important. “Kills mosquitoes” (6.08) was rated as the most important attribute. Others were “high quality and effective brand” (5.75), “reduces malaria” (5.71), “keeps mosquitoes away for a long time” (5.68), and “keeps mosquitoes away while sleeping” (5.67).

Table 65: Mean rating of mosquito control product attributes
Among all households

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Kills mosquitoes	6.08	6.22	6.41	5.86	6.04	5.89	6.2	6.06	5.91	6.25	6.09	6.08
Keeps mosquitoes away for a long time	5.68	5.76	5.86	5.62	5.59	5.55	5.76	5.73	5.42	5.86	5.74	5.64
Keeps mosquitoes away while sleeping	5.67	5.85	5.77	5.65	5.31	5.76	5.96	5.66	5.44	5.82	5.72	5.63
Kills other insects, other than mosquitoes	5.29	5.39	5.36	4.92	5.43	5.36	5.19	5.37	5.13	5.40	5.33	5.26
Is safe to use around children	5.01	5.76	5.43	3.38	5.03	5.45	5.22	4.63	5.00	5.36	4.75	5.18
Is a good value for the money	5.56	5.64	5.82	5.5	5.09	5.78	5.39	5.52	5.44	5.78	5.50	5.61
Is a long-term solution to mosquito problems	5.37	5.39	5.92	5.46	4.96	5.14	4.97	5.45	5.16	5.61	5.35	5.39
Is a high quality and effective brand	5.75	5.68	6.18	5.70	5.35	5.84	5.64	5.9	5.43	5.95	5.84	5.69
Reduces malaria	5.71	5.69	6.11	5.73	5.55	5.46	5.40	5.59	5.58	6.05	5.55	5.81

Association of attributes with mosquito control products

Respondents were read a list of attributes and asked which type(s) of mosquito control product they thought of when they heard each attribute. They could indicate more than one product. (Note that the base is respondents who were aware of a given product when prompted, and the table indicates the percentage of those respondents selecting a given product when a particular attribute was named.)

- Sprays/aerosols were the product most associated with all attributes except “is safe to use around children.”
- Sprays/aerosols were the product most strongly associated with killing mosquitoes (82%).
- Mosquito nets were seen as the safest product to use around children (71%). Other attributes highly associated with nets were “is a long-term solution” (57%), “keeps mosquitoes away while sleeping” (62%) and “reduces malaria” (51%). Nets were not associated with killing mosquitoes; only 11% mentioned this attribute.

Table 66: Association of attributes with mosquito control products
Among respondents who are aware of specific mosquito control products

	Mosquito coil	Sprays/Aerosol	Repellant	Mosquito net	Window screens	None	Don't Know
BASE	967	943	155	599	716	999	999
Kills mosquitoes	58.8	87.2	26.5	11.2	17.3	0.2	0.4
Keeps mosquitoes away for a long time	55.1	63.8	48.4	53.6	53.1	0.3	0.5
Keeps mosquitoes away while sleeping	55.7	63.3	55.5	62.1	52.5	0.2	0.3
Kills other insects, other than mosquitoes	32.3	84.6	29.7	14.2	19.1	1.7	2.3
Is safe to use around children	36.9	31.1	43.2	70.5	65.1	4.7	2.1
Is a good value for the money	48.1	64.1	41.3	47.1	40.2	1.9	1.5
Is a long-term solution to mosquito problems	39.2	62.9	40.6	56.8	52.1	1.3	1.9
Is a high quality/effective brand	33.5	76.1	40.0	41.1	34.4	0	2
Reduces malaria	48.4	71.4	45.2	50.6	50.7	2.5	5

Awareness of mosquito control brands

Respondents were asked to name the brands of mosquito control products they were aware of, even if they did not use them. After providing their responses, they were shown a card with the name and logo of different brands and were asked to indicate which other brand names, apart from the ones they already mentioned, they were aware of. The following tables show respondent awareness of brands by unprompted, prompted, and total awareness.

- Spontaneous (unprompted) awareness was highest for Mobil (51%), Shelltox (42%) and Raid (41%). Only 6%-18% spontaneously mentioned Elf, Baygon, or Rambo.
- Additional level of brand name awareness when prompted with a show card was Mobil (34%), Shelltox (28%), Rambo (27%), Elf (25%), Raid (24%), and Baygon (22%)
- Total awareness, as calculated by the addition of unprompted and prompted responses, was highest for Mobil (85%), Shelltox (70%) and Raid (65%).
- Unprompted, prompted, and total awareness of all brands was higher in urban areas than rural areas.

Table 67: Awareness of mosquito control product brand names, unprompted
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Baygon	17.5	27.0	18.0	20.6	19.0	3.0	46.3	20.4	12.7	11.7	25.6	12.2
Elf	5.6	7.5	1.5	9.5	7.5	2.0	10.0	6.6	6.7	2.3	7.3	4.5
Mobil	50.9	66.0	51.0	69.3	55.5	12.5	67.5	53.3	47.7	47	56.1	47.3
Raid	40.8	67.5	72.5	40.2	21.5	2.5	85	37.9	40.7	32.3	47.4	36.5
Rambo	17.5	4.0	1.0	43.2	39.0	0.5	8.8	24.5	18.3	11.7	21.3	15
Shelltox	41.8	17.5	9.0	52.3	49.0	81.5	25.0	51.1	39.0	39.3	45.9	39.2
Other	1	0.5	1	1.5	0	2	0	0.9	1.3	1	0.8	1.2

Table 68: Awareness of mosquito control product brand names, prompted
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Baygon	22.4	35.0	33.5	15.1	20.5	8.0	36.3	22.3	24.0	17.3	25.1	20.7
Elf	24.8	36.0	37.0	13.1	16.5	21.5	27.5	30.7	25.7	17.0	30.1	21.3
Mobil	33.9	27.0	39.0	15.6	26.5	61.5	22.5	38.6	32.3	33.7	35.3	33.0
Raid	23.9	25.5	25.5	18.6	27.5	22.5	12.5	24.8	20.7	29.3	22.3	25.0
Rambo	26.8	29.5	27.5	21.6	35.5	20.0	33.8	33.9	20.7	23.7	33.8	22.2
Shelltox	27.6	41.5	48.0	18.6	16.0	14.0	41.3	22.9	30.0	26.7	26.6	28.3

Table 69: Awareness of mosquito control product brand names, total
Among all respondents (multiple responses possible)

	Total	Site					Location				Urban/Rural	
		Lagos	Ibadan	Kano	Maidu-guri	Nsukka	Lagos Urban	Other Urban	Near Rural	Far rural	Total Urban	Total Rural
BASE	999	200	200	199	200	200	80	319	300	300	399	600
Baygon	39.9	62	51.5	35.7	39.5	11	82.5	42.6	36.7	29	50.6	32.8
Elf	30.4	43.5	38.5	22.6	24	23.5	37.5	37.3	32.3	19.3	37.3	25.8
Mobil	84.8	93	90	84.9	82	74	90	91.8	80	80.7	91.5	80.3
Raid	64.8	93	98	58.8	49	25	97.5	62.7	61.3	61.7	69.7	61.5
Rambo	44.3	33.5	28.5	64.8	74.5	20.5	42.5	58.3	39	35.3	55.1	37.2
Shelltox	69.5	59	57	70.9	65	95.5	66.3	74	69	66	72.4	67.5

Mosquito control brand name associations

Respondents were read a series of attributes and asked to indicate which brand(s) they associated with the attribute. The following table provides attributes by total (sum of unprompted and prompted) awareness.

- For most attributes Mobil and Raid ranked highest. Mobil ranked highest for “kills mosquitoes” (64%), “is a long-term solution to mosquito problems” (61%), “is a good value for the money” (62%), and “kills other insects, other than mosquitoes” (40%). Raid ranked highest for “is a high quality/effective brand” (66%), “keeps mosquitoes away for a long time” (64%), “is safe to use around children” (60%).

Table 70: Mosquito control product attribute and brand name association, total
Among respondents who were aware (spontaneous and prompted) of specific mosquito control product brand names

	Baygon	Elf	Mobil	Raid	Rambo	Shelltox	None	Don't Know
BASE	399	304	847	647	443	694	999	999
Kills mosquitoes	61.7	29.6	64	61.4	43.1	53	1.1	1.8
Keeps mosquitoes away for a long time	55.6	32.6	61.5	64.3	44	52.2	0.3	2
Keeps mosquitoes away while sleeping	64.9	42.4	64.7	63.4	51.2	61.4	0.8	2.8
Kills other insects, other than mosquitoes	31.1	21.7	39.9	37.4	30.7	35.9	22.5	8
Is safe to use around children	54.6	28.9	56.3	60.4	37.7	47.4	4.3	2.6
Is a good value for the money	58.4	33.6	62.1	58.4	46.5	49.4	4.3	3.6
Is a long-term solution to mosquito problems	56.1	28.6	60.9	57.8	39.7	50.6	0.5	1.6
Is a high quality/effective brand	60.7	36.2	64	65.8	46	54	3.6	4.8
Reduces malaria	61.7	29.6	64	61.4	43.1	53	1.1	1.8

SECTION 6

PROGRAM/PRODUCT IMPLICATIONS

6.1 GENERAL

There are a number of favorable aspects of the Nigerian context for ITM promotion and sales, but in order to increase net ownership, coverage, and appropriate use, efforts are needed to improve availability and access to ITMs, to overcome some negative perceptions of nets and net treatments, and to stimulate product demand. Currently there is relatively little information on nets, treatments, or malaria being made available to the public.

The favorable factors for ITM promotion and sales are:

- High awareness of malaria and general understanding that mosquitoes cause malaria
- Favorable attitudes toward safety of mosquito nets, compared to other insect control products
- Evidence of higher net coverage where nets have been promoted
- Fairly common use and frequent purchase of commercial insect control products (including aerosol sprays, which are comparatively expensive)
- Strong valuing of the product attributes that *insecticide treated nets* deliver (e.g., killing mosquitoes; killing other insects other than mosquitoes)
- High level of perceived advantages of nightly use of treated nets by vulnerable groups

Important barriers to overcome for ITM promotion and sales are:

- Perceived high cost of nets and perception that they are not affordable
- Limited access to nets; time to nearest purchase site is long and few outlets carry them
- Lack of variety in net size, color, and shape among available nets
- Some negative perceptions of nets
- Concerns about safety and potential adverse health effects of insecticide treatments, particularly with regard to young children and pregnant women
- Net treatment /retreatment is a new idea to most people, and virtually no one currently treats a net
- Inadequate use of ITMs by young children and pregnant women
- Erroneous beliefs about non-mosquito related causes of malaria; inadequate levels of knowledge of groups most vulnerable to severe malaria
- Low exposure to information about preventing malaria
- Common idea that a net is not necessary if you use aerosols

The majority of findings from this baseline study are consistent with results of NetMark's formative qualitative research in Nigeria. The qualitative research report, "NetMark Formative Qualitative Research in Nigeria" contains more detailed information on a number of topics discussed here and is available from NetMark.

Specific program and product implications from the baseline study presented in this report are outlined below.

6.2 KNOWLEDGE AND BELIEFS ABOUT MALARIA AND MOSQUITOES

- Recognition of the English term “malaria” was very high, demonstrating that the term can be used in health promotion activities and will be widely understood. Use of a single term around which educational efforts can build a common understanding will be very important in efforts to promote behavior change. Symptoms associated with “malaria” were generally consonant with the biomedical definition of the term, indicating that identification of the illness is already good, and little time needs to be spent on educating people to recognize signs. However, because very few people mentioned convulsions, a symptom of severe malaria, it will be important to link convulsions to malaria in public education efforts.
- Despite the fact that a high percentage of respondents knew that mosquitoes cause malaria, many people erroneously believed that there were other causes of malaria as well, especially getting hot/sun overexposure, overwork, and living in dirty surroundings. Malaria prevention efforts should emphasize that mosquitoes are the *only* cause of malaria and dispel erroneous beliefs about other causes.
- Knowledge of the groups most vulnerable to severe cases of malaria was somewhat low and there were some regional differences. Efforts to promote ITM acquisition and proper use can build on the existing perception that children are particularly vulnerable, but must emphasize the special vulnerability of children *under five* and pregnant women to suffering severe consequences of malaria.
- Exposure to information about malaria prevention was low. Information was being transmitted largely through health facilities, friends and neighbors and through mass media (radio, and TV in urban areas) but is entirely absent in some areas. Increased exposure to malaria prevention information is needed everywhere, but particularly in areas south of Lagos such as Ibadan and Nsukka. A coordinated strategy that provides information from a variety of media and interpersonal sources is likely to be effective.

6.2 MOSQUITO NETS

Perceived advantages and disadvantages of treated/untreated net use by vulnerable groups

- A high proportion of respondents perceived advantages of net use by vulnerable groups — children under five and pregnant women. Promotional efforts designed to achieve nightly net use by these groups can build on respondents’ perceptions that nets provide good protection against mosquitoes and malaria. However, fewer respondents in far rural areas mentioned protection against malaria, so this benefit should be particularly emphasized among rural populations.
- *Treated* nets were seen as especially effective in providing good protection against mosquitoes and malaria, with the added advantage of killing and repelling mosquitoes. Treated nets should be marketed as having these added advantages that consumers already like, as this will be a likely motivator to their use. Since net treatments are not visible, and people do not expect nets to have insecticide properties, it will be important to find strategies for product trials — possibly among opinion leaders — so that consumers see that treated nets deliver what they most want in a mosquito control product.
- Most people said that mosquitoes bother them most while sleeping, but many also said they are bothered by mosquitoes before sleeping as well. The fact that *treated* nets afford people in the room protection even when they are not sleeping under the net is likely to be an incentive for use, especially since treated nets do not have the strong noxious smell that aerosols do.
- Most respondents cited disadvantages for a child under five to sleep under a net, including the child being/feeling trapped or suffocated, feeling discomfort from heat or lack of air, and inconvenience. These perceived disadvantages should be addressed in promotional activities as well as in product design. However, product modification should be addressed in light of any cost increases they would involve.

- Respondents cited disadvantages of *treated* nets as well, voicing concern about the potential danger of the insecticide to young children and pregnant women and the noxious smell. Negative perceptions of treated nets appear to be based on previous experience with aerosols and coils (e.g., smell, irritation, and adverse health effects). Since smell and irritation are minimal and transient in treated nets, negative perceptions are likely to be overcome when products are actually used. Promotional strategies should emphasize opportunities for product trial. In addition, IEC messages and product development should take into account consumer concerns about smell and safety. At the same time, since the smell of the insecticide dissipates shortly after treatment, consumers may think that the insecticide is no longer effective; some means should be found to indicate to the consumer that insecticide is present and still effective.

Access to ITMs

- Access to nets was limited, and there is essentially no access to net treatments. Most consumers would have to travel quite far (an average of one hour by bus — less in urban areas and more in rural ones) to obtain a net; it appears that few outlets other than some open-air markets carried them. Many consumers did not know where to get nets at all. Currently, virtually no one treats nets. A key challenge will therefore be to make nets and treatments more widely accessible and available through various commercial sector outlets, bringing them closer to where people live, with particular attention to rural areas.
- Promotional efforts should provide information on where nets and treatments can be obtained.

Mosquito net ownership, treatment, and appropriate use

- Net ownership was low, with great variation by site. Non-owners, especially those in rural areas, said that the main reason they did not own a net was cost. A key challenge to increasing net ownership should be placed on changing the perception of nets as unaffordable, particularly because people are already spending a lot of money on mosquito control products and nets are economical in the long-run. Possibly commercial nets would be seen as reasonably priced when compared with the cost of regular aerosol use, or when weighed against the cost of multiple cases of malaria. Ideally, subsidized nets would be targeted to low income groups unable to afford commercial nets.
- Dislike of nets (especially in Kano), or the perception that nets were unnecessary (especially in Lagos), was another important reason for non-ownership. Promotional efforts are required to stimulate demand, with special attention given to countering the perception of nets as unnecessary and to product development that takes into account consumer product dislikes.
- Some non-owners, especially those living in or near Lagos, felt that nets were unnecessary or said that they did not like them, and special attention must be given to countering these perceptions.
- Because brands of nets were generally unknown or nets were tailor-made, commercial players will need to develop and market strong brand(s) of nets that are associated with the characteristics that consumers want.
- The proportion of children under five and pregnant women sleeping under nets in net-owning households was fairly good, yet net usage of these vulnerable groups when analyzed among all households was extremely low. Promotional and educational efforts are necessary to encourage net use by children under five and pregnant women.
- Given that consumers slept under nets only approximately 8 months of the year, behavior change strategies are needed to encourage year-round net use and address any barriers to doing so.

- The concept of treating nets with insecticide was almost entirely new and no one treats nets. A key challenge will be to increase involvement of the commercial sector in the production and distribution of net treatment. Major promotional and communication efforts are needed as well to raise awareness of net treatment and treatment rates. Such a campaign can build on respondents' positive reaction to the concept of ITMs, emphasizing that these nets are new and innovative, since they kill/repel mosquitoes and other insects and prevent malaria—highly valued attributes of mosquito control products that are not currently associated with nets by many consumers. A long-lasting net would help to overcome the challenge of getting people to re-treat nets, but as long as untreated nets are used, retreatment will be necessary.
- Over three-quarters of nets owned by households that had been washed were washed at least once a month. Promotional efforts must address how often nets should be treated/retreated as well as washed in between treatments. Long-lasting treated nets must be able to withstand frequent washing.

Consumer net preferences

- Product development should take into consideration consumer preferences for net size (king and double), shape (mainly rectangular but round/conical as well) and color (generally light-colored, white, pink, light blue, light green) to raise sales and enhance strength of brand. (It should be noted that in the qualitative research, consumers explained that they prefer rectangular nets for their shape and because they were thought to allow greater air flow, while conical nets were liked for the fact that they are easy to hang because only one point is needed. If a rectangular net that hangs from a single point could be devised, it would combine two features that consumers like.) However, product modification should be addressed in light of any cost increases they would involve.

6.4 OTHER MOSQUITO CONTROL PRODUCTS

Awareness of mosquito control products and methods

- Awareness of commercial insect control products — other than mosquito nets — was moderately high, even in rural areas. Use of these products and frequency of purchase was moderate. The fact that urban and rural dwellers know about and use commercial insect control products is favorable for net and insecticide treatment promotion. In addition, the fact that many consumers currently spend significant money on aerosol sprays is favorable for ITM promotion and sales. Promotional efforts should emphasize the insecticide characteristics of treated nets (e.g. killing mosquitoes and other insects), which are likely to have strong appeal to consumers. In addition, efforts should stress that use of insecticide treated nets is more economical in the long run than use of aerosol sprays.
- Since many aerosol sprays were bought in open-air markets, as were the majority of nets, it is likely nets and ITMs can be sold together in these settings (though, as NetMark's qualitative research showed, not necessarily by the same vendors).

Perceptions of mosquito control attributes, products, and brands

- The most highly valued attribute that consumers wanted in an insect control product was that it kills mosquitoes. They also wanted a product that keeps mosquitoes away for a long time and while sleeping, and that reduces malaria. Currently, nets are not strongly associated with these attributes, although they are considered to be safe around children. The fact that consumers strongly value the key attributes that ITMs deliver is very positive for ITM promotion and sales. ITM promotion activities should highlight the fact that treated nets kill mosquitoes, keep mosquitoes away while sleeping and for a long time, and reduce malaria. Branded nets should stress that they are a high-quality and effective brand.

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